

Exhibit 7 (Corrected)

**UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

ENTROPIC COMMUNICATIONS, LLC,

Plaintiff,

v.

CHARTER COMMUNICATIONS, INC.,

Defendant.

Civil Action No. 2:22-cv-00125-JRG

**REBUTTAL EXPERT DECLARATION OF RICHARD A. KRAMER PH.D.
REGARDING CLAIM CONSTRUCTION**

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I, Richard A. Kramer, declare as follows:

I. INTRODUCTION

1. I am over the age of 18 and am competent to make this Rebuttal Declaration (“Declaration”). I have personal knowledge, or have developed knowledge of these technologies based upon education, training, or experience, of the matters set forth herein. If called upon to do so, I would testify competently thereto.

2. I have been retained by counsel for Entropic Communications, LLC (“Entropic”) in the above-captioned action as an independent consultant to offer opinions regarding how a person of ordinary skill in the art would understand certain claim terms in U.S. Patent No. 8,223,775 (the “’775 Patent”); U.S. Patent No. 8,284,690 (the “’690 Patent”); and U.S. Patent No. 10,135,682 (the “’682 Patent”), (collectively, the “Patents at Issue”). Specifically, I am submitting this Declaration to address the meaning and construction of certain disputed terms in response to the Expert Declaration of Dr. Kevin Almeroth Regarding Claim Construction. For the purposes of this Declaration, I have not been asked to opine on the meaning of any other disputed terms not addressed below.

3. In forming my opinions, I understand that the claims should be interpreted as they would be understood by a person of ordinary skill in the art (“POSITA”) of the patent at the time its application was filed. I understand that the claims are to be construed with reference to the patent’s specification, the claims, and the prosecution history, in light of the plain meaning of the terms used in the claims, and with reference to other sources of information, such as dictionaries, textbooks, and literature or other patents in the same or related fields.

4. My opinions are based on my years of education, research and experience, as well as my investigation and study of relevant materials, including those identified in this Declaration.

5. I may rely upon these materials, my knowledge and experience, and/or additional materials in forming any necessary opinions. Further, I may also consider additional documents and information to rebut arguments raised by the Defendants. I reserve any right that I may have to supplement this Declaration if further information becomes available or if I am asked to consider additional information. Furthermore, I reserve any right that I may have to consider and comment on any additional expert statements or testimony of Defendant's expert(s) in this matter.

6. My analysis of the materials produced in this investigation is ongoing and I will continue to review any new material as it is provided. This Declaration represents only those opinions I have formed to date. I reserve the right to revise, supplement, and/or amend my opinions stated herein based on new information and on my continuing analysis of the materials already provided.

7. If requested, I am prepared to explain at a technology tutorial or claim construction hearing the technology disclosed in the Patents at Issue, including the state of the art around the filing dates of this patent. This may include, among other things, background information on communication systems, broadband communications systems / cable systems (*e.g.*, cable TV systems, HFC (Hybrid Fiber Coax) cable systems, etc.), satellite communication systems, RF (Radio Frequency)¹ systems, including systems architectures, components, and applications thereof for these types of systems. Any explanations that I may provide with respect to a technology tutorial or claim construction hearing may also include the use of visual aids or other demonstrations. I am also prepared to rebut, as necessary, matters raised by the expert(s) of

¹ "RF," which means "Radio Frequency," is a term and technology that not only applies to wireless systems, but also applies to terrestrial systems such as, for example, cable systems (including cable and/or HFC systems) and related devices. This was likewise true well before the earliest possible priority dates of the Patents at Issue.

Defendant Charter Communications, Inc. (“Charter”)—whether in declarations, reports, depositions, or hearings—and to address related matters raised in the course of claim construction.

II. QUALIFICATIONS

8. In this section, I provide a summary of my educational background, employment background, and other relevant qualifications. A more detailed statement of my professional qualifications, including education, publications, honors and awards, professional activities, consulting engagements, and other relevant experience is included in my curriculum vitae, attached as Exhibit A to this Declaration, and is incorporated by reference herein.

9. I have 30 plus years of in-depth industry experience developing and deploying successful communication systems, broadband communications systems / cable systems (*e.g.*, cable TV systems, HFC (Hybrid Fiber Coax) cable systems, etc.), satellite communication systems, and RF systems, including systems architectures, components, and applications thereof for these types of systems—to name a few.

10. From 2007 to present, I currently serve as President of SIS Development, Inc. / Security Industry Services, Inc., an engineering and technical services company specializing in the technical areas of, for example, communication systems (including cable TV/broadband systems), video systems, wireless networking, Internet technologies, and client-server systems. Exemplary technical services that I have provided include assisting companies in the cable TV and communications industry. For example, I assisted a company in the development an SoC (System on a Chip) for a cable TV set-top box.

11. From 2003 to 2007, I served as the Vice President-Engineering and General Manager-Technology at GE-Security, a division of General Electric (GE) which is now owned by United Technologies Corporation (UTC). At GE, I was the lead engineer for the world-wide “Video Systems Group” that developed video products, multimedia communications systems and

products, and HFC based systems and products. At GE, I was also the lead engineer for residential and commercial security systems engineering and development for North America.

12. From 1998 to early 2003, I was the top technology leader at a number of high-tech start-up companies. Those high-tech start-up companies included Miraxis Corporation (a division of EMS Technologies, Inc., now Honeywell, Inc.). At Miraxis, I was the Vice President of Product Development from late 2001 to early 2003, developing IP network and digital video solutions in the satellite TV industry (*e.g.*, a DTH (Direct to Home) / DBS (Direct Broadcast Satellite) solution). As the Vice President of Product Development, I was responsible for all aspects of the system architecture and components to provide both multimedia content and two-way modem communications.

13. In 2000, I joined Ivex Corporation (“Ivex”), where I served as the Vice President of Engineering and led all technology development. At Ivex I led the development of video surveillance solutions including a product called the VSA (Video Streaming Appliance) and an Internet/network system/software solution called ViewOps. Our solutions allowed retail chains like Ace Hardware, Finish Line, and Eddie Bauer to remotely view their sites and facilities using servers. Further, the user could log into the ViewOps system to obtain pre-recorded events that were triggered by a wide variety of sensor inputs.

14. In 1998, I joined Home Wireless Networks, Inc., where I was promoted to Vice President of Engineering. At Home Wireless Networks, I led all engineering in the development of leading-edge wireless products, including 900 MHz RF circuits, antennas, and transceivers. Home Wireless Networks’ products—which included the first integrated voice and low-cost IEEE 802.11 WiFi access point—were launched under the British Telecom and Telenor brands in Europe and the BellSouth and MCI brands in the United States. At the time we used well known

IC (Integrated Circuit) design methods and SoC (System on a Chip) design methods. For example, as Vice President of Engineering at Home Wireless Networks, I was responsible for the development of an SoC (System on a Chip) that integrated an ARM processor. The ARM processor core was provided to us in the form of a hardware library (*e.g.*, in the form of HDL (Hardware Description Language)) that we then integrated into our SoC as a whole. We then had an outside semiconductor foundry manufacture our SoC.

15. From 1995 to 1998, I was the engineering/technology leader for multimedia cable TV set-top boxes in North America for Scientific-Atlanta, Inc. (prior to being acquired by Cisco Systems, Inc.) within the Advanced Video Systems (AVS) Division. My group developed and successfully launched Scientific-Atlanta's first internally designed cable TV set-top box (also called an HCT which means Home Communication Terminal). The development of the cable TV set-top boxes that I led engineering for included responsibility for RF, analog, and digital design for the finished products.

16. At Scientific-Atlanta, in addition to my leadership in the development of cable TV products, I was also responsible for testing the products for our entire division as a whole. Subsequently, I directly managed the construction and operation of our own complete cable TV Head End (HE) system. When we designed products, we evaluated the performance of our products within the entire cable TV system including within the cable TV HE that we operated. Such evaluations of performance included the measurement and monitoring of a whole host of system impairments related to cable TV system two-way communications including those measurements related to SNR (Signal to Noise Ratio) and other modulation impairments.

17. At Scientific-Atlanta I was later promoted and served as the top technology leader on the Strategic Planning Team for the AVS Division, working on the next generation advanced

video products including the overall system design, software and HCTs. In this role, each of the functional technology areas including firmware, hardware, system software and cable system communication headend equipment reported to me in a dotted line matrix/cross-functional organizational structure for the development of our next generation of products and solutions.

18. As part of my responsibilities at Scientific-Atlanta, I stayed current with industry standards that we implemented into our systems such as, for example, the DOCSIS (Data Over Cable Service Interface Specification) standard, the MPEG (Motion Pictures Expert Group) standard, and various Internet/networking standards such as the SNMP (Simple Network Management Protocol) standard. Moreover, the products and solutions that I led the development of at Scientific-Atlanta included a plethora of technologies that included, for example, the development of cable TV communication circuits and systems and RF circuit design.

19. From 1987 to 1995, I held a number of technology positions at Schlumberger Industries, Electricity Management North America. From 1987 until 1989, I was an Electronic Design Engineer at Schlumberger. As an Electronic Design Engineer, I designed circuitry and firmware for solid-state electronic electric meters including the design of a PLC (Programmable Logic Controller) which was an IC that did not include a processor. I also designed an Application Specific Integrated Circuit (ASIC). The use of ASICs and PLCs were well known technologies at the time. I worked on many aspects of design for our core metering products including the design of AMR (Automatic Meter Reading) electronics. The electricity meters that I designed further employed a wide array of sensors to measure electric power consumption, low battery conditions, tamper detection, and the like.

20. In 1989, I was promoted to Senior Electronic Design Engineer at Schlumberger. In 1990, I was promoted to Hardware Manager of the Recorders and Translation Systems where I led

the development of data interfaces between electricity meters and a utility's remote central office. In 1994, I was promoted to Engineering Manager, Residential and Commercial Metering.

21. As Engineering Manager, Residential and Commercial Metering for Schlumberger, I oversaw product development of residential and commercial solid-state electronic electric meters for North America. For example, I was responsible for the engineering design of the "MACS" (Metering And Communications System) that was used to remotely read and control electricity meters installed within multi-tenant buildings using the existing power lines. We called this PLC (Power Line Carrier) communication technology. In fact, PLC was one of the first communication methods used for "Smart Homes" which at that time was in its early infancy. PLC was seen as a means to communicate between various appliances and the utility meter within a home. As part of my R&D (Research and Development) duties, I extensively researched Smart Home technology and PLC technology and as a result I attended a Parks Associates Smart Home workshop in or around 1994.

22. In 1984, I began work as an Electronic Design Engineer in the Nuclear Power Division at Babcock & Wilcox. I was later promoted to Senior Electronics Design Engineer.

23. In the Special Products and Integrated Field Services team at Babcock & Wilcox, my work involved designing and developing both: (a) monitoring systems to monitor the operation of the nuclear power plant equipment, and (b) inspection/robotic repair systems to inspect and repair nuclear power plant components inside the nuclear containment buildings. My work required me to implement a wide variety of sensor technologies into the control room monitoring and robotic systems that I designed.

24. Related to monitoring systems at Babcock & Wilcox, as just one example, I helped redesign portions of a Safety Parameter Display System (SPDS). The SPDS was a system used in

the control room of nuclear power plants to allow the operators to monitor the plethora of equipment and related sensors within a nuclear power plant. For example, such sensors determined temperature, the state of valves and other equipment (closed / not closed), water levels, pressure, and radiation levels to name a few.

25. Related to inspection/robotic repair systems at Babcock & Wilcox, I was one of the key designers of the electronics, software, and firmware (for measurement, control, and communications) for a robot called “ROGER” (Remotely Operated Generator Exam and Repair). My work in designing ROGER required me to work with a plethora of sensor technologies including cameras (to monitor activities and position of the robot), temperature sensors (for monitoring equipment health) and motion sensors (that enabled us to detect and control ROGER’s position and movement within a nuclear power plant steam generator). My developments further implemented of cable TV systems to enable the visual inspection within that containment building and other high-radiation areas. ROGER was also outfitted with various exchangeable “tools” that allowed us to perform different types of inspections and repairs on nuclear steam generators which utilized a wide variety of sensor technologies to monitor remote equipment. The sensor states and parameters, including temperature and switch positions, were sent back via a dedicated serial communications network channel called “SDLC,” to remote systems operated by personnel far away from the highly radioactive steam generator.

26. In 1984, I received a Bachelor of Science in Electrical Engineering, magna cum laude, from the University of Toledo.

27. In 2017, I received a Master of Science in Electrical and Computer Engineering from Oregon State University, where I graduated with a 4.0 GPA (Grade Point Average). My thesis, entitled “Optimization of Interactive Live Free Viewpoint Multiview Video Streaming

Bandwidth,” was based on my own research in streaming multiview video over the Internet using peer-to-peer networks and wireless broadcast transmissions.

28. In 2022, I received a Ph.D. in Electrical and Computer Engineering from Oregon State University based on my academic research that I started in 2015. I graduated with a 4.0 GPA (Grade Point Average). My dissertation, entitled “Machine Learning Bandwidth Optimization of Interactive Live Free-Viewpoint Multiview Video for Sporting Events,” was based on my own research combined with my applied industry knowledge in the fields of artificial intelligence, machine learning, classifiers, video / video detection / video analytics / video content prediction, and communication systems (including cable/HFC and satellite systems). The heart of my dissertation was to intelligently predict and then optimally communicate multimedia data over two-way DVB (Direct Video Broadcast) terrestrial systems (which include two-way DVB cable TV systems and DVB IPTV (Internet Protocol TV) systems)), two-way DVB satellite systems, and P2P (Peer-to-Peer) systems.

29. I am a member of the Institute of Electrical and Electronics Engineers (IEEE).

30. I am a lifetime member of the honor society of Phi Kappa Phi.

31. In 2003, I further attended Emory University’s, Goizueta Business School and took numerous MBA (Master of Business Administration) courses. Emory’s business school program at the time was ranked in the top 10 globally by Business Week and The Financial Times.

32. I have received two U.S. patents: (a) U.S. Patent No. 5,701,253, entitled “Isolated Current Shunt Transducer,” which describes and at the time new transducer sensor design for measuring electricity, and (b) U.S. Patent No. and 5,422,939, entitled “Parallel Off-Hook Detection for Both Line-Available and Phone Pick-Up Detection,” which describes an at the time new device for sensing the state of telephone lines.

III. COMPENSATION

33. I am being compensated for my services in this matter at my standard consulting rate of \$725 per hour. I am also being reimbursed for expenses that I incur during the course of this work. My compensation is not contingent upon the results of my study, the substance of my opinions, or the outcome of any proceeding involving the challenged claims. I have no financial interest in the outcome of this matter.

IV. MATERIALS CONSIDERED

34. In preparing this declaration, I reviewed and considered the following materials, and any others referenced in the body of my declaration:

- 1) the Patents at Issue and their file histories, as well as the patents and file histories for the applications identified as Related U.S. Applications on the face of the Patents at Issue;
- 2) the parties' proposed claim constructions;
- 3) the Declaration of Dr. Kevin Almeroth Regarding Claim Construction ("Almeroth Declaration"); and
- 4) the extrinsic evidence cited herein.

35. I may use these documents and information, or other information obtained during the course of this or related proceedings, as well as representative charts, graphs, schematics and diagrams, animations, and models based on those documents and information, to support and to explain my testimony. I am informed that discovery in this action is ongoing and I reserve the right to modify or supplement my opinions, this declaration, and/or to submit additional declarations to address any information obtained, or positions taken, as discovery continues.

36. My opinions are based in part on a review and analysis of the above-mentioned documents and materials. The materials relied upon within this Declaration are of the type that an expert in my field would have reasonably relied upon in forming opinions. I have also drawn on

my education, experience, and knowledge of basic engineering principles for communication systems, broadband communications systems / cable systems (*e.g.*, cable TV systems, HFC (Hybrid Fiber Coax) cable systems, etc.), satellite communication systems, RF systems, including systems architectures, components, and applications thereof, that were already in use prior to, and within the timeframe of the earliest priority dates for the claimed subject matter in the Patents at Issue.

V. LEGAL STANDARDS

37. I am not an attorney or a patent attorney, and I offer no opinions on the law. I have, however, been informed by counsel regarding various legal standards that may apply to this case, and I have applied those standards where necessary in arriving at my conclusions.

38. I understand that patent claims are construed from the viewpoint of a person of ordinary skill in the art (“POSITA”) at the time of the invention. I understand that this hypothetical POSITA is considered to have the normal skills and knowledge of a person in the applicable technical field. The factors that may be considered in determining the level of ordinary skill include: i) the education level of the inventor; ii) the types of problems encountered in the art; iii) the prior art solutions to those problems; iv) the rapidity with which innovations are made; v) the sophistication of the technology; and vi) the education level of active workers in the field.

39. I understand that the most important evidence to consider in construing the claims is the “intrinsic” evidence, which I understand includes the claim language, the patent specification, and the prosecution history, including *inter partes* review (“IPR”) and other post-grant proceedings with the United States Patent and Trademark Office’s (“USPTO”) Patent Trial and Appeal Board (“PTAB”).

40. I further understand that a POSITA must read the claim terms in the context of the claim itself, as well as in the context of the entire patent specification. I understand that in the

specification and/or prosecution history, the patentee may specifically define a claim term in a way that differs from the plain and ordinary meaning of the term. I understand that the prosecution history of the patent is a record of the proceedings before the USPTO and may contain explicit representations or definitions made during prosecution that affect the scope of the patent claims. I understand that an Applicant may, during the course of prosecuting the patent application, limit the scope of the claims to overcome prior art or to overcome an Examiner's rejection, by clearly and unambiguously arguing to overcome or distinguish a prior art reference or by clearly and unambiguously disclaiming claim coverage.

41. In interpreting the meaning of the claim language, I understand that a POSITA may also consider "extrinsic" evidence, which consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, positions taken by the patent owner in other litigations, dictionaries, and learned treatises. I understand that extrinsic evidence may not be relied on if it contradicts or varies the meaning of the claim language provided by the intrinsic evidence, particularly if the Applicant has explicitly defined a term in the extrinsic record.

42. I also understand that patent claim may not be interpreted one way to avoid invalidity and another way to find infringement. In other words, a claim must be read the same way for validity as for infringement.

43. I understand that Section 112 of the Patent Laws requires that a patent claim particularly point out and distinctly claim the subject matter that the Applicant regards as his or her invention. I understand that a patent claim is invalid for indefiniteness if it fails to inform, with reasonable certainty, a person of ordinary skill in the art about the scope and bounds of the invention claimed. I understand a claim is indefinite if its scope is not clear enough that a POSITA could have determined with reasonable certainty whether a particular embodiment infringes the

claim. I also understand that when considering whether a claim is indefinite, a POSITA may consider both the intrinsic and extrinsic evidence.

44. I understand that a term may be found to be indefinite when the claim language is facially subjective or ambiguous and the meaning of a term and/or scope of the claims is not “reasonably certain” to one skilled in the art.

45. I understand that failure to provide explicit antecedent basis for a term does not always render a claim indefinite. If the scope of a claim would be reasonably ascertainable by those skilled in the art, then the claim is not indefinite.

46. I understand there are instances where inherent components of elements recited have an antecedent basis in the recitation of the components themselves. For example, the limitation “the outer surface of said sphere” would not require an antecedent recitation that the sphere has an outer surface.

VI. LEVEL OF SKILL IN THE ART

47. In rendering the opinions set forth in this Declaration, I was asked to consider the patent claims and the prior art through the eyes of a person of ordinary skill in the art (“POSITA”). The “art” is the field of technology to which a patent is related. In my Declaration, I use the term POSITA to refer to the same hypothetical person of ordinary skill in the art. I considered factors such as the educational level and years of experience of those working in the pertinent art, patents and publications of other persons or companies, the sophistication of the technology, the types of problems encountered in the art, the prior art solutions to those problems, and the speed at which innovations are made. I understand that a POSITA is not a specific real individual but rather a hypothetical individual having the qualities reflected by the factors discussed above.

48. The Patents at Issue relate to communication systems such as broadband communications systems / cable systems (*e.g.*, cable TV systems, HFC (Hybrid Fiber Coax) cable

systems, etc.), satellite communication systems, and RF systems, including systems architectures, components, and applications. I note that each of the Patents at Issue relate to these types of systems as I further discuss below. These types of technologies were typically designed by Electrical, Firmware, and Software Engineers that had experience working with these types of communication systems. I have performed such development myself, and I have further worked with and directly managed these types of Engineers in the industry. I am therefore very familiar with the common skill sets required for this type of work.

49. Taking these factors into consideration and based on my experience in the industry at the time of the earliest priority dates of the Patents at Issue, it is my opinion that a POSITA at the time of the earliest possible priority date of each of the Patents at Issue would have been an Engineer with at least a Bachelor's Degree in Electrical Engineering (or equivalent), with at least two years of experience developing broadband/cable TV/satellite communication systems and solutions.

50. I understand Charter's expert Dr. Almeroth has proposed that the level of ordinary skill would be a person having at least i) a bachelor-level degree in electrical engineering or a related subject and three or more years of experience working in the field of cable television signal processing and communication systems; ii) a master's-level degree in electrical engineering or a related subject and one or more years of experience working in the field of cable television signal processing and communication systems; or iii) a Ph.D.-level degree in electrical engineering or a related subject and at least some experience working in the field of cable television signal processing and/or communication systems. *See* Almeroth Decl. ¶ 27.

51. I am qualified to provide opinions concerning what a POSITA would have known and understood at that time, and my analysis and conclusions herein are from the perspective of a POSITA as of that date and would apply under either party's proposed set of qualifications.

52. As of approximately 2003, I was at least as qualified as the POSITA identified above. Thus, I understand the perspective of a POSITA as of at least as early as 2003, the earliest priority date of any of the Patents at Issue.

VII. '775 PATENT

A. Overview of the '775 Patent

53. The '775 Patent is titled "Architecture For A Flexible And High-Performance Gateway Cable Modem," was filed on September 30, 2003, and issued on July 17, 2012. Accordingly, for my analysis herein, I have assumed the date of September 30, 2003 as the earliest possible priority date for the '775 Patent.

54. The '775 Patent is directed towards a novel architecture for cable modems. As the '775 Patent explains "[t]he future gateway cable modem (CM) will provide a wide range of data networking and VoIP service" and "[t]he major challenge in designing such a gateway cable modem is integration of these services with the basic cable modem functionality in an efficient and cost effective [way]." '775 Patent, 1:13–18.

55. The '775 Patent discloses various embodiments providing a "highly flexible, high performance system capable of handling multiple cable modem voice, data and networking services" where a cable modem engine is "completely partitioned" from the data networking engine. *Id.* at 1:61–2:4. In the disclosed embodiments, complete partitioning is accomplished, for example, by "localizing data networking functions in the data networking engine processor and localizing cable modem functions in the cable modem engine processor." *Id.* at 4:16–19.

56. Figure 1 illustrates an exemplary cable modem system architecture 100 according to the '775 Patent. I have annotated Figure 1 below.

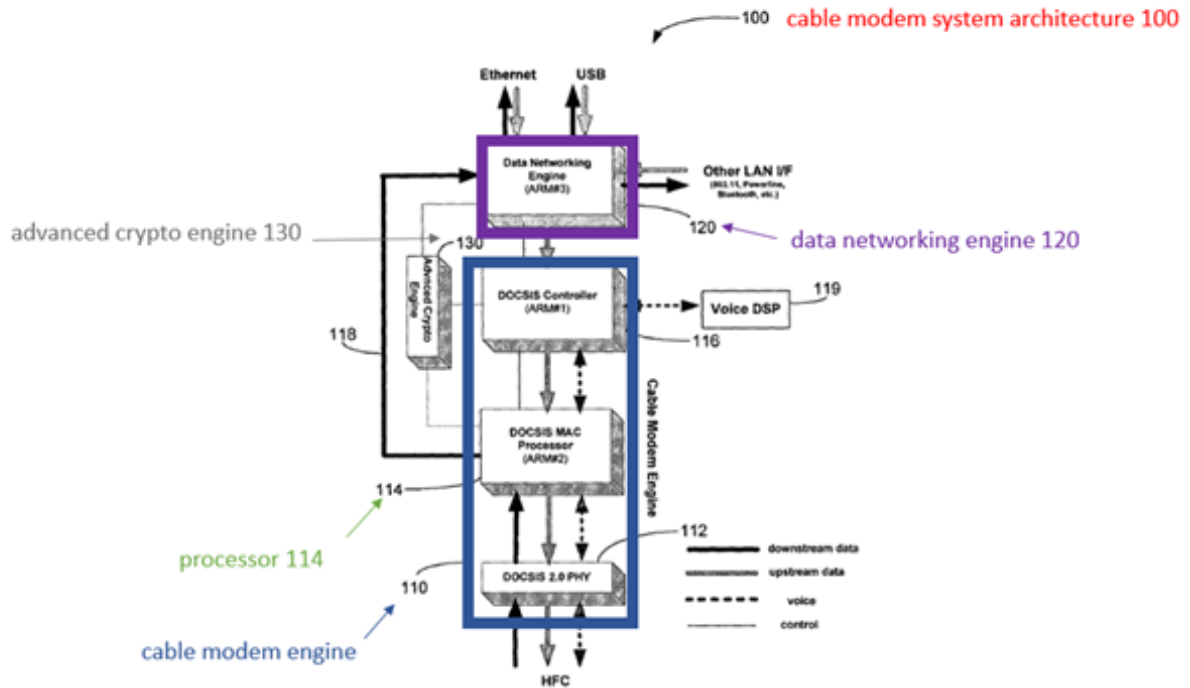


Figure 1

57. System 100 includes three major subsystems: cable modem engine 110, data networking engine 120, and advanced crypto engine 130. *Id.* at 2:49–52. Cable modem engine 110 implements DOCSIS cable modem functions. *Id.* at 2:55–56. The data networking engine 120 implements data networking functions. *Id.* at 3:49–53. “Advanced crypto engine 130 provides hardware support for crypto functions.” *Id.* at 4:4–5.

58. In the embodiment of Figure 1, the cable modem engine includes a “processor 114,” and the data networking engine also includes a processor such as, for example, an ARM processor. *See id.* at FIG. 1.

59. At least one data bus is implemented at, for example, path 118. This allows communication between the “Data Networking Engine” “120” and the “Cable Modem Engine” “110” while still retaining functional partitioning. *See id.*

B. Summary of The '775 Patent File History

60. I have reviewed the prosecution history leading to the issuance of the '775 Patent. A copy of the file history is attached as Exhibit B.

61. On September 30, 2003, the Applicant filed the application leading to the '775 Patent. The originally filed claims are reproduced below:

1. A cable modem system comprising:

a data networking engine that performs data networking functions; and

a cable modem engine that performs all other cable modem functions; the cable modem engine being completely partitioned from the data networking engine.
2. A cable modem system as claimed in claim 1, wherein all DOCSIS functions are localized in the cable modem engine.
3. A cable modem system as claimed in claim 2, wherein VoIP functionality is embedded in the cable modem engine.
4. A cable modem system as claimed in claim 1, and further comprising an advanced crypto engine that performs all crypto functions.
5. A cable modem system as claimed in claim 1, wherein the cable modem engine comprises:

a DOCSIS PHY layer;

a DOCSIS MAC processor; and

a DOCSIS controller.

6. A cable modem system as claimed in claim 5, wherein the DOCSIS PHY layer comprises a hardware transmitter and receiver.

7. A cable modem system as claimed in claim 5, wherein the DOCSIS MAC processor processes downstream PDU packets and forwards the processed packets directly to the data networking engine without the involvement of the DOCSIS controller in order to boost downstream throughput.

8. A cable modem system as claimed in claim 5, wherein all VoIP functionality is implemented in the DOCSIS controller.

9. A cable modem system as claimed in claim 8, wherein the VoIP functionality is in conformance with the PacketCable specification.

10. A cable modem system as claimed in claim 5, wherein the data networking engine is responsible for all data networking processing including advanced multi-port bridging/routing with NAT/firewall and VPN, and home networking applications.

11. A cable modem system as claimed in claim 10, wherein the data networking engine comprises the entire embedded portal services functionality of the CableHome specification.

12. A cable modem architecture comprising:

a cable modem engine comprising:

a DOCSIS PHY layer comprising a transmitter and receiver;

a DOCSIS MAC processor that implements real-time critical MAC functions for both upstream and downstream communications; and

a DOCSIS controller implementing VoIP functionality; and

a data networking engine implementing all data networking processing and home networking applications, wherein the data networking engine is completely decoupled from the cable modem engine.

13. A cable modem architecture as claimed in claim 12, wherein the DOCSIS controller provides VoIP functionality in accordance with the PacketCable specification, and wherein the data networking engine provides the embedded portal services functionality of the CableHome specification, wherein the CableHome functionality is provided by the data networking engine is completely decoupled from the PacketCable and DOCSIS functionality provided by the cable modem engine.

14. A cable modem architecture as claimed in claim 13, wherein the DOCSIS MAC processor is an ARM9TDMI-based RISC processor, and wherein the DOCSIS controller is an ARM940-based RISC processor.

15. A method for providing a flexible and partitioned cable modem gateway comprising:

providing data and home networking functionality in a data networking engine;

providing DOCSIS and VoIP functionality in a cable modem engine; and

partitioning the data networking engine from the cable modem engine so that the data and home networking functionality is completely decoupled from the DOCSIS and VoIP functionality.

Exhibit B at ENTROPIC_CHARTER_0005459–0005462.

62. On February 19, 2009, the Examiner issued a non-final rejection. Among other things, the Examiner rejected originally filed Claims 1–15 as being anticipated by Brooks (U.S. Publication No. 2001/0039600). By way of example, at the time, Claim 1 recited the following:

1. A cable modem system comprising:

a data networking engine that performs data networking functions; and

a cable modem engine that performs all other cable modem functions; the cable modem engine being completely partitioned from the data networking engine.

Id. at ENTROPIC_CHARTER_0005459.

63. The Examiner asserted:

As per claim 1, Brooks teaches a cable modem system comprising: a data networking engine that performs data networking functions (Abstract; paragraphs 0013-0016); and a cable modem engine that performs all other cable modem functions (Abstract; paragraphs 0013-0016); the cable modem engine being completely partitioned from the data networking engine (Abstract; paragraphs 0013-0016).

Id. at ENTROPIC_CHARTER_0005497.

64. On May 19, 2009, the Applicant responded to the February 19, 2009 rejection. The Applicant amended the claims, including Claim 1, as shown below.

1. (Currently Amended) A cable modem system comprising:

a data networking engine implemented in a first circuit that includes at least one processor, the data networking engine programmed with software that when executed by the at least one processor of the first circuit causes the data networking engine to perform that performs home data networking functions including interfacing with customer provided equipment; and

a cable modem engine implemented in a second circuit that includes at least one processor, the second circuit being separate from the first circuit, the cable modem engine programmed with software that when executed by the at least one processor of the second circuit causes the cable mode engine to perform that performs all other cable modem functions other than the home networking functions performed by the data networking engine, the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine; and

a data bus that connects the data networking engine to the cable modem engine, wherein the cable modem functions performed by the cable modem engine are being completely partitioned from the home networking functions performed by the data networking engine.

Id. at ENTROPIC_CHARTER_0005510.

65. The Applicant also traversed the rejection “because the cited portions of [Brooks] *do not correspond to aspects of the claimed invention directed to the data networking functions performed by a data networking engine being **completely partitioned/decoupled** from the other cable modem functions performed by a cable engine.*” *Id.* at ENTROPIC_CHARTER_0005514 (emphasis added).

66. The Applicant further explained that the office action created uncertainty as to how the Examiner was interpreting and applying the disclosures of Brooks to the claims at issue. Specifically, the Applicant stated:

[T]he Office action does not identify what element of [Brooks] is being asserted as *corresponding to Applicant's data networking engine*.

Id. at ENTROPIC_CHARTER_0005514 (emphasis added).

67. On February 5, 2010, the Examiner issued a final rejection. Among other things, the Examiner again issued a rejection of the claims as anticipated by Brooks. The Examiner stated the following with respect to Claim 1:

As per claim 1, Brooks teaches a cable modem system comprising: a data networking engine implemented in a first circuit that includes at least one processor (Figure 2), the data networking engine programmed with software that when executed by the at least one processor of the first circuit causes the data networking engine to perform home networking functions including interfacing with customer provided equipment (Abstract; paragraphs 0014, 0026, 0037, 0066-0068); a cable modem engine implemented in a second circuit that includes at least one processor, the second circuit being separate from the first circuit, the cable modem engine programmed with software that when executed by the at least one processor of the second circuit causes the cable modem engine to perform cable modem functions other than the home networking functions performed by the data networking engine, the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine (paragraphs 0026, 0037, 0042-0046, 0050-0052); a data bus that connects the data networking engine to the cable modem engine, wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine (0042-0046).

Id. at ENTROPIC_CHARTER_0005540.

68. The Examiner also provided the following response to the Applicant's remarks:

The data networking engine and cable modem engines are represented in figures 1 and 2 of the Brooks reference, including buses carrying out separate networking functions. For example, the data networking engine interfaces with the peripheral devices and employs operating system functions, and the cable modem engine implements DOCSIS functionality. These entities are completely partitioned from each other, as discussed in the cited sections.

Paragraphs 0036-0042 discuss the transfer of packets between the cable modem and data networking engines. Therefore, examiner respectfully disagrees with the assertion that there is no data networking engine, and it is respectfully submitted that the Brooks invention fully teaches the limitations of claim 7. Further, paragraph 0010 discusses the inclusion of various CableLabs standards. Because PacketCable and CableHome specifications constitute these standards, Brooks fully teaches the claim limitations.

Id. at ENTROPIC_CHARTER_0005544.

69. On April 5, 2010, the Applicant responded to the February 5 office action. The Applicant again traversed the rejection and explained the Applicant's continued uncertainty as to how the Examiner was interpreting and applying the disclosures of Brooks to the claims at issue. Specifically, the Applicant stated the following:

For example, ***Applicant is uncertain how [Brooks] discloses aspects of the claimed invention directed to data networking functions performed by a data networking engine being completely partitioned/decoupled from the other cable modem functions performed by a cable modem engine.*** The Examiner has repeatedly failed to identify elements of [Brooks] corresponding to these aspects as requested. In contrast, the Office Action make the conclusion statement [sic] that “the data networking engine and the cable modem engines are represented in Figures 1 and 2 of [Brooks]” (*see, e.g.,* p. 8 of the Office action). However, Applicant is uncertain how any reasonable interpretation of these Figures can provide correspondence. For example, ***Figure 2 of [Brooks] discloses only two processors, each of which, therefore, must correspond to the claimed data-networking and cable-modem engines. However, the discussion of Figure 2 makes clear that the cable modem functions are performed by CMAC unit 224*** (*see, e.g.,* paragraph 0042). Therefore, in order for the cable modem engine to contain a processor and perform the CMAC functions as claimed, the cited cable modem engine must include circuitry to connect the processors with the CMAC unit. Because available connecting circuitry would be shared with the other processor, Applicant is uncertain how the asserted

cable modem engine and home networking engine can be completely partitioned as claimed. Because the Office Action has not identified these claimed aspects in [Brooks], a *prime facie* case has not been presented and Applicant requests that the rejection of claims 1-16 be withdrawn.

Id. at ENTROPIC_CHARTER_0005557–0005558 (emphasis added).

70. The Applicant further confirmed its uncertainty of the Examiner’s application of Brooks by stating, for example: “Applicant submits that the Examiner’s failure to identify corresponding elements as requested in Applicant’s response constitutes an incomplete answer under M.P.E.P. § 707.07 and, therefore, makes the finality of the Office Action improper.” *Id.* at ENTROPIC_CHARTER_0005558. The Applicant further explained, “[i]n order to comply with 35 U.S.C. § 132, sufficient detail must be provided by the Examiner regarding the alleged correspondence between the claimed invention and the cited reference to enable Applicant to adequately respond to the rejections.” *Id.*

71. On May 11, 2010, the Examiner issued an Advisory Action, in which the Examiner withdrew some rejections but continued the finality of the rejection of Claims 1–16 associated with the Brooks ’006 disclosure. The Examiner explained the following:

Brooks’ abstract, for example, discloses bifurcated processing architecture. The first processor processes information flowing to and from cable media interface circuitry. This constitutes the data networking engine, which performs the interacting with equipment as claimed. The second processor performs the management of some message processing and scheduling, which constitutes cable modem functions other than those of the data networking engine (please see paragraph 0026). This then constitutes the cable modem engine, as claimed. Claim 9 of the Brooks reference further teaches partitioned processors, where the co-processor supports the processing of cable media and performs data transfer, and the first processor performs a plurality of other processing functions.

Id. at ENTROPIC_CHARTER_0005572.

72. On June 7, 2010, the Applicant submitted a request for continued examination along with an amendment to the claims and remarks. Among other things, the Applicant explained its continued requests for the Examiner to explain the application of the Brooks reference because

“it was pointed out that there was continued uncertainty as to how the Examiner was interpreting and applying the disclosures of Brooks ’600 to the claims at issue.” *Id.* at ENTROPIC_CHARTER_0005580. In particular, the Applicant explained the continued uncertainty as follows:

[I]t was pointed out that in Brooks ’600, only two processors were disclosed. Therefore, from the Examiner’s position that “the data networking engine and cable modem engines are represented in figures 1 and 2” (Office Action, p. 8), it would follow that one of the two processors corresponded to the networking engine, and the other of the two processors corresponded to the cable modem engine. ***It was further pointed out that while the discussion concerning Figure 2 in Brooks ’600 paragraph 0042 makes clear that cable modem functions are performed by CMAC unit 224,*** if the cable modem engine is to contain a processor and perform CMAC functions as claimed, the cited cable modem engine must include circuitry to connect one of the processors with the CMAC unit. It was noted, however, that because available connecting circuitry would be shared by both the one processor and the other processor, the asserted cable modem engine and home networking engine could not be completely partitioned as claimed.

Id. at ENTROPIC_CHARTER_0005580–0005581 (emphasis added).

73. In other words, as the Applicant explained, processor 102, which the Examiner had designated as the data networking engine, handles many cable modem functions:

[I]t appears that the Examiner may be asserting that the cable modem processor includes second processor 104, that the data networking engine is first processor 102 (see Fig. 2), and that the CMAC/CPHY block (114, 118, 224 and 228) is also a part of the cable modem engine. However, processor 102 handles many cable modem functions (see Fig. 4, paragraphs 0053 to 0062), and is explicitly described as “programmed to implement the desired MAC functionality” (paragraph 0026). Paragraph 0025 states “in the case of DOCSIS, typical MAC functionality includes MPEG and MCNS decoding and frame synchronization.” On the other hand, processor 104 is described only as providing operating system support and that it “may manage some message processing and scheduling” (paragraph 0026, emphasis added). Thus, the Examiner’s designation of the first processor as the “data networking engine” is at odds with the Brooks ’600 description of processor 102 as being “programmed to implement the desired MAC functionality.”

Id. at ENTROPIC_CHARTER_0005582 (emphasis in original).

74. The Applicant further explained that the specific architecture of Brooks, in which the CMAC/CPHY block (114, 118, 224, and 228) communicates with both processors 102 and

104 by sharing the same data paths and sharing the same direct memory access controller, did not “square” with certain features in Claim 1 and Claim 15:

The Examiner’s apparent designation of the first processor 102 in Brooks ’600 as the “data networking engine,” and the second processor 104 and the CMAC/CPHY block (114, 118, 224 and 228) as the “cable modem engine,” further does not square with the claim 1 feature that “the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine,” and the claim 15 feature of “partitioning the data networking engine from the cable modem engine so that the data and home networking functionality is completely decoupled from the DOCSIS and VOIP functionality.” This is because the CMAC/CPHY block (114, 118, 224 and 228) communicates with both the processors 102 and 104 by sharing the same data paths and sharing the same direct memory access controller. (See peripheral bus 112 – bridge 110 – system bus 108 in Fig. 1 and APB 214 – DMA Controller/ASB-APB Bridge 212 – ASB 210 in Fig. 2, and paragraphs 0034 and 0035.)

Id. at ENTROPIC_CHARTER_0005582.

75. On September 2, 2011, the Examiner issued a non-final rejection for Claims 1–16. The Examiner did not include Brooks as a basis for the rejection. *See id.* at ENTROPIC_CHARTER_0005592–0005602.

76. On March 2, 2012, the Applicant amended the claims and added the now-asserted Claim 18 (as Claim 20). Claim 20 is reproduced below:

20. **(New)** A cable modem system comprising:

a data networking engine implemented in a first circuit that includes at least one processor, the data networking engine programmed with software that when executed by the at least one processor of the first circuit causes the data networking engine to perform home networking functions including interfacing with customer provided equipment;

a cable modem engine implemented in a second circuit that includes at least one processor, the second circuit being separate from the first circuit, the cable modem engine programmed with software that when executed by the at least one processor of the second circuit causes the cable modem engine to perform cable modem functions other than the home networking functions performed by the data networking engine, the cable modem functions including interfacing with cable media, and the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine, the cable modem engine including a DOCSIS controller and a DOCSIS MAC processor, the DOCSIS MAC processor configured to process downstream PDU packets and forward the processed packets directly to the data networking engine without the involvement of the DOCSIS controller in order to boost downstream throughput; and

a data bus that connects the data networking engine to the cable modem engine, wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine.

Id. at ENTROPIC_CHARTER_0005619.

77. On March 19, 2012, the Examiner allowed the claims. *See id.* at ENTROPIC_CHARTER_0005628–0005632. Claim 20 was unchanged and issued as Claim 18.

C. Disputed Terms of the '775 Patent

78. I understand that there is a dispute over five (5) claim terms within Claim 18 of the '775 Patent. Below I have reproduced Claim 18 of the '775 Patent in its entirety and have emphasized the terms that are in dispute.

18. A cable modem system comprising:

a data networking engine implemented in a first circuit that includes at least one processor, the data networking engine programmed with software that when

executed by the at least one processor of the first circuit causes the data networking engine to perform home networking functions including interfacing with customer provided equipment;

*a cable modem engine implemented in a second circuit that includes at least one processor, the second circuit being separate from the first circuit, the cable modem engine programmed with software that when executed by the at least one processor of the second circuit causes the cable modem engine to perform cable modem functions other than the home networking functions performed by the data networking engine, the cable modem functions including interfacing with cable media, and the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine, the cable modem engine including a **DOCSIS controller** and a **DOCSIS MAC processor**, the **DOCSIS MAC processor** configured to process downstream PDU packets and forward the processed packets directly to the data networking engine without the involvement of the **DOCSIS controller** in order to boost downstream throughput; and*

a **data bus** that connects the data networking engine to the cable modem engine, wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine.

'775 Patent, Claim 18.

79. Dr. Almeroth concludes that these terms are indefinite;² however, his analysis is flawed on numerous levels. For the reasons I outline below, a POSITA would not interpret the claims as Dr. Almeroth does and would not find Claim 18 indefinite.

1. **“a data networking engine implemented in a first circuit . . .” and “a cable modem engine implemented in a second circuit . . .” (Claim 18)**

a. **Among other things, Dr. Almeroth’s opinions assume a POSITA would ignore “circuit” as used in the plain claim language**

80. I understand that the dispute centers around the following claim language:³

² Including “indefinite” for claim terms “DOCSIS MAC processor” and “DOCSIS controller” if not interpreted as Dr. Almeroth requires (*i.e.*, “[i]f ... does not mean ...”). Almeroth Decl. ¶ 29.

³ I note that I have done my analysis considering not only the below claim language but also the claim terms as a whole and Claim 18 as a whole.

- “a data networking engine implemented in a first circuit that includes at least one processor” (Claim 18)
- “a cable modem engine implemented in a second circuit that includes at least one processor, the second circuit being separate from the first circuit” (Claim 18)

81. Dr. Almeroth opines that these terms are ambiguous because:

[T]here is no way to determine what “circuit” means in the claims or how many circuits a particular cable modem contains. Nor is there a way to determine where one circuit begins and another ends. It is therefore impossible to determine if any particular cable modem contains “a first circuit” and “a second circuit” as claimed, or if the “second circuit” is “separate from the first circuit.”

Almeroth Decl. ¶ 29; *see also id.* at ¶¶ 64–75.

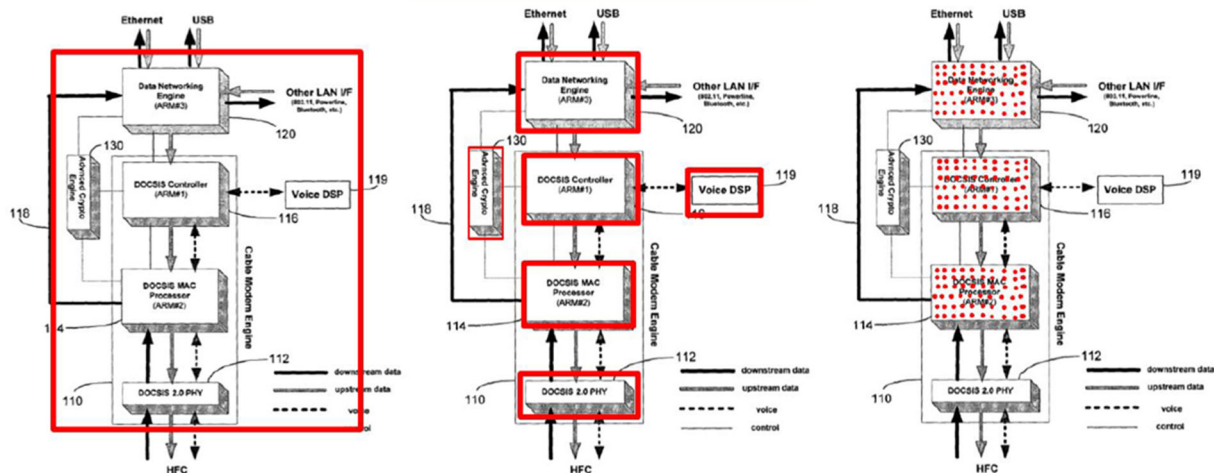
82. I disagree. The ’775 Patent does not claim a first and second “circuit” in a vacuum. Rather, Claim 18 recites “a data networking engine implemented in a first circuit that includes at least one processor” and “a cable modem engine implemented in a second circuit that includes at least one processor, the second circuit being separate from the first circuit.”

83. A POSITA has no difficulty understanding that circuits, such as those of the data networking engine, are delineated from other circuits, such as those of the cable modem engine. This is extremely common. The definition of “circuit” Dr. Almeroth cites confirms this point: “circuit” “A combination of electrical components interconnected to perform a particular task. At one level a computer consists of a single circuit; at another, it consists of hundreds of interconnected circuits.” Almeroth Decl. ¶ 65 (citing Appx. C, at 99).

84. This is further true of the specific context of the ’775 Patent. As of the priority date, a POSITA would have been familiar with systems-on-a-chip (SoCs) and application-specific integrated circuits (ASICs) (*i.e.*, a “chip”). *See, e.g.*, ’775 Patent, 4:58–62. Furthermore, a POSITA would have been familiar with data networking functions (*e.g.*, web server, CableHome, etc.) and cable modem functions (*e.g.*, DOCSIS). *See, e.g., id.* at Abstract. Therefore, a POSITA would

readily appreciate that Claim 18 claims separate data networking and cable modem engines, wherein each is implemented on a circuit that includes at least one processor.

85. Dr. Almeroth attempts to create ambiguity by looking at circuits in the abstract while ignoring the plain language of Claim 18, the specification, and the embodiments depicted in Figures 1 and 2. Dr. Almeroth draws boxes around the physical parts depicted in Figure 1:



Almeroth Decl. ¶¶ 67, 69, 71.

86. Dr. Almeroth concludes that the claim is indefinite because none of the above illustrations show “[a] data networking engine implemented in a first circuit [and] a cable modem engine implemented in a second circuit.” *See id.* at ¶¶ 67–72.

87. Dr. Almeroth’s physical boxes ignore that the specification describes these components as the portions of physical circuits that embody the functionalities of the cable modem shown:

System 100 comprises three major subsystems: *cable modem engine 110*; *data networking engine 120*; and advanced crypto engine 130. The *functional sub-components* of these three-subsystems are illustrated in greater detail in FIG. 2.

’775 Patent, 2: 50–54 (emphasis added).

88. This is consistent with Dr. Almeroth’s dictionary definition, which speaks in terms of division based on function: “[a] combination of electrical components interconnected to perform

a particular task.” Almeroth Decl. ¶ 65 (citing Appx. C at 99). A POSITA would have recognized at the time, as I experienced firsthand, the combination of electrical components interconnected to perform a particular task included integrated circuits, wherein an SoC comprised one or more integrated circuits. *See* ’775 Patent, 4:25–28; *see also id.* at 4:58–62.

89. The specification provides an exemplary embodiment where the data networking engine and cable modem engine may be implemented on a single chip having two processors, *i.e.*, one for the data networking engine and one for the cable modem engine. *See* ’775 Patent, 4:58–62 (“***A chip*** implementing cable modem system 100 will have only a small incremental hardware cost/functional increase over current stand-alone cable modem chips. The major cost difference relative to current chips is the addition of another ARM940-type processor to the chip.”). In such an embodiment, the cable modem engine and data networking engine would be implemented on the same circuit board (if not the same die).

90. A POSITA would therefore not discard their prior experience and plain understanding of separate circuits where the separation is in terms of function. Thus, a POSITA would not understand “separate” to mean “separate circuit boards.”

2. “DOCSIS MAC processor” / “DOCSIS controller” (Claim 18)

a. A POSITA would understand the meaning of “DOCSIS MAC processor” and “DOCSIS controller”

91. Dr. Almeroth opines that the term DOCSIS MAC processor must mean “the DOCSIS MAC processor as described in the patent specification (*see, e.g.*, ’775 Patent, 3:1–20; 4:41–54; *id.* at Figures 1 & 2).” Almeroth Decl. ¶ 29; *see also id.* ¶¶ 76–77. Dr. Almeroth also opines that the term DOCSIS controller must “mean the DOCSIS controller as described in the patent specification (*see, e.g.*, ’775 Patent, 3:21–48; 4:41–57; *id.* at Figures 1 & 2).” Almeroth

Decl. ¶ 29. According to Dr. Almeroth, this is because these terms do not have a plain and ordinary meaning to a POSITA. Almeroth Decl. ¶¶ 76–77.

92. I disagree. Consistent with the plain meaning of the terms, a POSITA reading the claims and specification would understand that the DOCSIS MAC processor and the DOCSIS controller are portions of the cable modem engine corresponding to the functions of MAC processing for DOCSIS, and controlling the DOCSIS functions, respectively. ’775 Patent, 2:55–59; *see also* ¶¶ 57, 87, *supra*.

93. This plain understanding is confirmed by the specification, which describes these blocks and their corresponding functions in detail. For example, “DOCSIS MAC processor” 114 “implements real-time critical MAC functions for both upstream (US) and downstream (DS) communications.” ’775 Patent, 3:1–3. These MAC functions can include “US and DS synchronization, DS MAC address filtering, DS protocol filtering, US and DS PHS, concatenation, fragmentation, MAP processing, US transmission scheduling, as well as DOCSIS link-layer DES encryption and decryption.” *Id.* at 3:3–7. Similarly, the specification describes how “DOCSIS controller” 116 implements DOCSIS functions such as MAC management message (MMM) processing, IGMP, MAC address learning, classification, US protocol filtering, CM IP stack and software downloading, cable modem IP/UDP functions, SNMP, DHCP, TFTP, and TOD functionality, and cable modem provisioning. ’775 Patent, 3:27–38.

b. Dr. Almeroth misconstrues “DOCSIS MAC processor” and “DOCSIS controller” by requiring them to be implemented on separate, specific physical processors

94. Dr. Almeroth opines that Claim 18 is indefinite because the cable modem engine is implemented in a circuit “that includes at least one processor.” Almeroth Decl. ¶ 78. Specifically, he opines:

[T]his would cover a cable modem engine that includes only one processor. However, the claim also expressly requires that the cable modem engine contain a DOCSIS MAC processor and a DOCSIS controller, both of which are ARM processors.

Almeroth Decl. ¶ 78 (parentheticals omitted).

95. In my opinion there are two errors here. First, Dr. Almeroth misinterprets “DOCSIS MAC processor” and “DOCSIS controller” as being physical processors with some physical separateness. Second, Dr. Almeroth contends that they must be the specific brand/architecture of physical processors (ARM processors) identified as exemplary in the specification. A POSITA would find no support for any of these contentions.

96. There is an *exemplary* embodiment depicted in Figure 1 where “the processing-intensive functions of the cable modem and data networking are rationally distributed among three different [physical] processors.” ’775 Patent, 4:43–49. In this exemplary embodiment, there are two different physical processors in the cable modem engine, and the “DOCSIS MAC processor” functionality is assigned to one processor core while the “DOCSIS controller” functionality is assigned to the second processor core. But in another example embodiment, Claim 18 does not require that the functions of the “DOCSIS MAC processor” and the “DOCSIS controller” be embodied or implemented in separate physical processors. *See id.* at 4:16–19 (“This is accomplished by localizing data networking functions in the data networking engine processor [singular] and localizing cable modem functions in the cable modem engine processor [singular]”) (annotation added). Thus, Claim 18 simply requires that the cable modem engine “includes at least *one* processor.”

97. Moreover, a POSITA would find Dr. Almeroth’s interpretation inconsistent with other description in the specification. The ’775 Patent discloses that “A chip implementing cable modem system 100 will have only a small incremental hardware cost/functional increase over

current stand-alone cable modem chips. The major cost difference relative to current chips is the addition of *another ARM940-type processor to the chip*.” *Id.* at 4:58–62 (emphasis added). That means the cable modem engine itself may be implemented on a single processor core (the data networking engine embodied in the other). In fact, the ’775 Patent clearly states “[t]his is accomplished by localizing data networking functions in the *data networking engine processor* [singular] and localizing cable modem functions in the *cable modem engine processor* [singular]”. *See id.* at 4:16–19 (annotation and emphasis added). This is consistent with the claim language for the “cable modem engine [] second circuit” requiring “at least *one*” processor (the “data networking engine [] first circuit” requiring the other). In light of this disclosure, a POSITA would not conclude that the claimed “DOCSIS MAC processor” and “DOCSIS controller” must be implemented on separate processors.

98. A POSITA would further understand that, although ARM processors are common processors, there are many other types of processors that were readily available at the time of the invention and there would be no reason to exclude other kinds of processors from the scope of the claims. The specification similarly makes this clear by explaining that Figure 1 is a non-limiting “embodiment.” *See* ’775 Patent, 3:17–19 (“*In one implementation*, processor 114 is an ARM9TDMI-based RISC processor”) (emphasis added); 3:24–25 (“*In one implementation*, controller 116 is an ARM940-based RISC processor”) (emphasis added).

99. Thus, in my opinion, a POSITA would be able to ascertain the scope of Claim 18 with reasonable certainty and would not misinterpret the “DOCSIS MAC processor” and “DOCSIS controller” functional blocks as limited to separate, specific physical processors.

3. “data bus” (Claim 18)

100. Dr. Almeroth opines that “data bus” is indefinite because of a purported disclaimer during prosecution of the ’775 Patent related to the scope of the term “completely partitioned.” Specifically, he states:

The claim limitation requiring “a data bus that connects the data networking engine to the cable modem engine, wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine” renders Claim 18 and its dependents indefinite. The applicants successfully argued during prosecution that a “data networking engine” and a “cable modem engine” are not “completely partitioned” if they share “connecting circuitry” or “data paths.” The “data bus” as claimed would be shared “connecting circuitry” and a shared “data path,” meaning the cable modem engine and the data networking engine cannot be “completely partitioned” as claimed.

Almeroth Decl. ¶ 29; *see also* ¶ 79.

101. I disagree. Both terms “data bus” and “completely partitioned” appear in the ’775 Patent claims, including Claim 18, and, as a result, no POSITA would consider there to be a disclaimer in the scope of the term “completely partitioned” to exclude a data bus. In addition, the Examiner understood the claim scope during prosecution and did not find a “data bus” incompatible with “completely partitioned.”

102. A POSITA would not understand that the presence of a data bus between the data networking engine and the cable modem engine destroys their separate nature. *See, e.g.*, ¶¶ 82–84, 89, 90, *supra*. The ’775 Patent confirms the standard understanding of a POSITA that two processors with complete separation of their functions remain completely separated even with a data bus in between allowing information exchange. *See, e.g.*, ¶¶ 82–84, 89, 90, *supra*; *see also*, ’775 Patent, Fig 1, 3:14–17, 3:22–24.

103. Moreover, during prosecution, the Applicant never limited “completely partitioned” to exclude “any circuitry” or any shared “data path” as Dr. Almeroth asserts. *See*

Almeroth Decl. ¶¶ 57–63; *see also* ¶ 79. There is no redefinition or disclaimer and Dr. Almeroth has not identified any.

104. If one accepted Dr. Almeroth’s incorrect analysis regarding disclaimer, then the requirements that Claim 18 have “a data networking engine implemented in a first circuit that includes at least one processor . . .;” “a cable modem engine implemented in a second circuit that includes at least one processor, the second circuit being separate from the first circuit . . .;” and “a data bus that connects the data networking engine to the cable modem engine, wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine,” would seem to result in zero claim scope—if I understand what Dr. Almeroth is proposing. In other words, there could be no device that meets the elements of claim 18. This seems very unlikely to be the view of any POSITA.

105. It appears Dr. Almeroth reaches this conclusion based on a misunderstanding of the statements the Applicant made with respect to Brooks. The first time the Applicant addressed Brooks (in the May 19, 2009 office action response), the Applicant expressly stated that the “Office action does not identify what element of [Brooks] is being asserted as corresponding to Applicant’s data networking engine,” (Exhibit B at ENTROPIC_CHARTER_0005514) and continued to make this point when the Applicant was discussing Brooks.

106. Brooks discloses two programmable physical processors, 102 and 104, but as the Applicant pointed out, the functionality of these processors is *not partitioned* as required by the claims. Applicant reiterated this same problem throughout the dialogue with the Examiner concerning Brooks, specifically explaining that there is not a “data networking engine” in Brooks because processor 102 handles many cable modem functions, and processor 104 is described only

as providing operational system support and “may manage some message processing and scheduling.” Exhibit B at ENTROPIC_CHARTER_0005582 (emphasis in original).

107. During prosecution, Applicant attempted to understand how the Examiner was attempting to map Brooks onto the claims. In this discussion, the Applicant again reiterated that Brooks ***does not disclose the claimed partitioning*** of the cable modem engine and data networking engine.

108. To properly frame the discussion, I first observe that a third component of Brooks was discussed, called the “CMAC/CPHY” component 224. As the Applicant explained in the April 5, 2010 office action response, “Figure 2 [of Brooks] makes clear that the cable modem functions are performed by CMAC unit 224 (*see, e.g.,* paragraph 0042).” *Id.* at ENTROPIC_CHARTER_0005557. I have included an annotated version of Brooks Figure 2 below, showing the CMAC unit and processors 102 and 104:

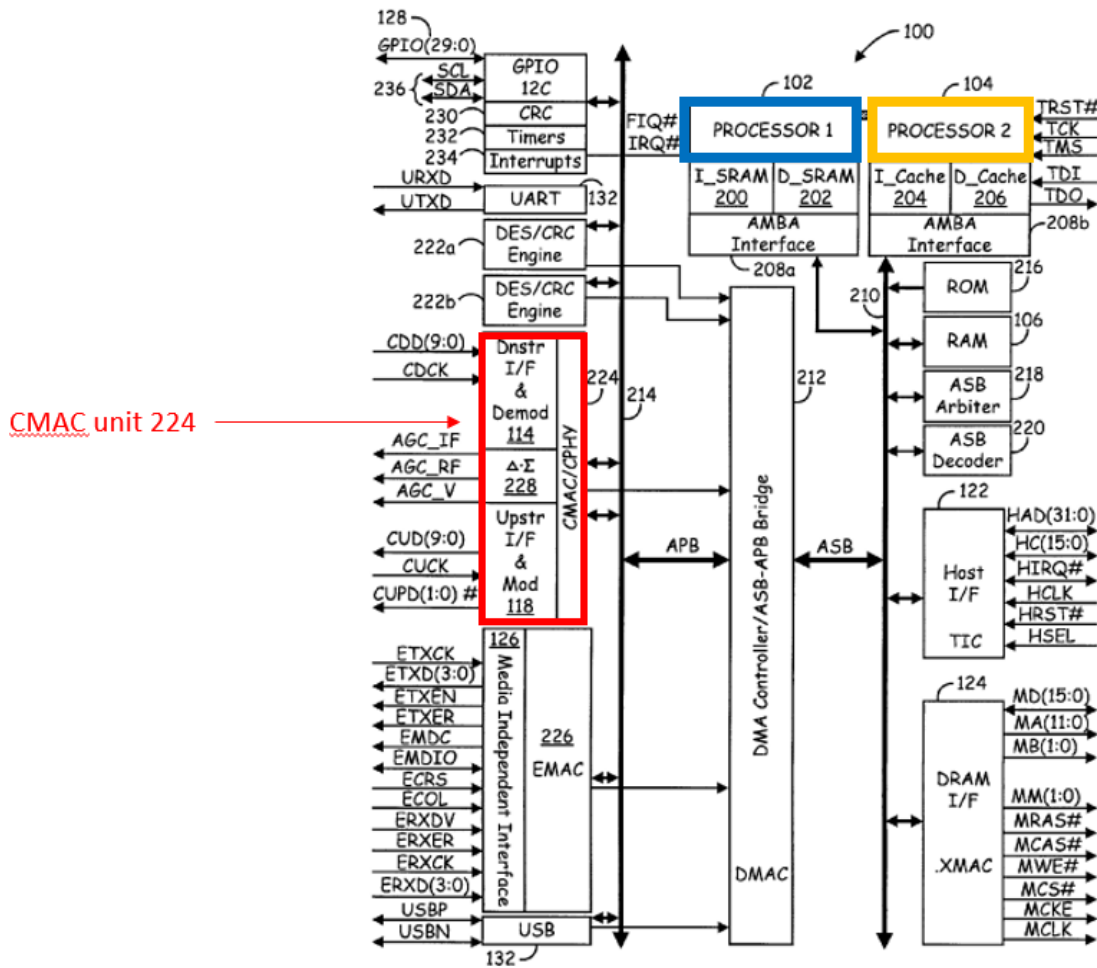


Fig. 2

Exhibit C, U.S. Pub. No. 2001/0039600 (“Brooks”), FIG. 2.

109. Applicant elaborated that CMAC 224 is responsible for, at least in part, the cable modem functions:

[T]he Office Action make the conclusion statement [sic] that “the data networking engine and the cable modem engines are represented in Figure 1 and 2 of the [Brooks]” (see, e.g., p. 8 of the Office action). However, Applicant is uncertain how any reasonable interpretation of these Figures can provide correspondence. For example, *Figure 2 of [Brooks] discloses only two processors, each of which, therefore, must correspond to the claimed data-networking and cable-modem engines. However, the discussion of Figure 2 makes clear that the cable modem functions are performed by CMAC unit 224* (see, e.g., paragraph 0042). Therefore, in order for the cable modem engine to contain a processor and perform the CMAC functions as claimed, the cited cable modem engine must include circuitry to connect the processors with the CMAC unit. Because available connecting circuitry

would be shared with the other processor, Applicant is uncertain how the asserted cable modem entire and home networking engine can be completely partitioned as claimed.

Exhibit B at ENTROPIC_CHARTER_0005557–0005558 (emphasis added); *see also* Exhibit C, [0042] (“a cable media access controller (CMAC) 224, including a System timer and interfaces to the cable downstream PHY circuitry 114 and cable upstream PHY circuitry 118, is provided to Support communications with a cable media 134”).

110. The Applicant explained it was “uncertain how the asserted cable modem engine and home networking engine can be completely partitioned” because it appeared that the Examiner’s assertion of Brooks would not make sense unless the Examiner was considering the “cable modem engine” to include *one* of the processors (102 or 104)—but *not the other—plus the CMAC unit 224* and the “available connecting circuitry [] shared with the other processor.” Exhibit B at ENTROPIC_CHARTER_0005557–0005558.

111. However, the Applicant explained that in Brooks there is no indication that one processor and not the other would be a “completely partitioned” cable modem engine or data networking engine. *See id.* (“Because available connecting circuitry would be shared with the other processor, Applicant is uncertain how the asserted cable modem entire and home networking engine can be completely partitioned as claimed”). In other words, the Applicant was uncertain about how the Examiner was applying Brooks because there was no more of a reason to draw a box around the CMAC and processor 1 than there was to draw a box around the CMAC and processor 2, due to the specific layout of Brooks Figure 2.

112. In summary, Applicant’s statements concerning Brooks focus on the point that there is no disclosure of *partitioned* engines (data networking and cable modem), with programmable processors. Everything from the file history that Dr. Almeroth focuses on simply reiterates this point in various ways. A POSITA would not understand the Applicant’s statements

regarding Brooks to be a disclaimer of a data bus or other connection between the data networking engine and cable modem engine.

113. I also note an important point overlooked by Dr. Almeroth's position. The Applicant did not make any representations disclaiming a connection between the processors of a data networking engine and a cable modem engine because that connection in Brooks was not the subject of Applicant's statements.

114. The processors 102 and 104 of Brooks are connected directly, by a "system bus 108," in Figure 1, also known as "Advanced System Bus (ASB 210)" in Figure 2, highlighted below:

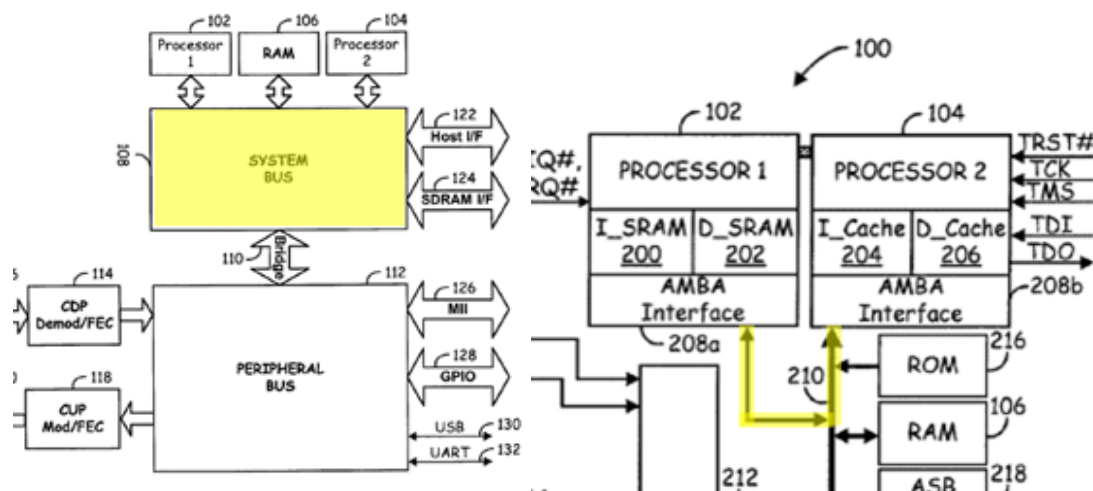


Exhibit C, FIGs. 1–2 (excerpt, annotated); *see also id.* at [0027] (“the first and second processors 102 and 104, are communicatively coupled to a system bus 108.”), [0032] (“Advanced System Bus (ASB 210)”), [0034] (“The ASB210 is the bus on which the first and second processors 102 and 104, RAM memory 106, and other direct memory access (DMA) devices reside.”). This connection was not referenced in the discussion with the Examiner that Dr. Almeroth relies upon.

115. What was referenced is a different connection. The Applicant pointed the Examiner to the connections between (1) each processor 102/104 and (2) a third component, *i.e.*, the CMAC

unit—*not* the connection between processors 102 and 104 *to each other*. Dr. Almeroth’s annotation of Figure 2 illustrates the point. Dr. Almeroth highlights the shared connection between each of the two processors on the one hand, and the CMAC on the other (shown in yellow in Almeroth Decl. ¶ 62). But Dr. Almeroth does not highlight the direct connection between the processors—because that point is not the subject of the file history discussion.

116. To summarize, the issue of whether or not there can be a data path between the processor of a data networking engine and the processor of a cable modem engine was not at issue in the ‘775 Patent file history. A POSITA would not interpret Applicant’s discussion of shared “connecting circuitry” or “data paths” as having been related to all “connecting circuitry” or “data paths,” as Dr. Almeroth suggests, because clearly the Applicant and the Examiner knew that there was a connection between the processors.

117. Based on the above analysis, it is clear to me that the Applicant’s statements regarding Brooks during the prosecution of the ‘775 Patent do not amount to any disavowal of claim scope, nor did the Applicant interpret the claims in any way that is inconsistent with the plain and ordinary meanings. Because Dr. Almeroth’s opinion concerning indefiniteness relies on his misinterpretation of the prosecution history, it is my opinion that he has not shown any ambiguity in the claims scope.

118. A POSITA would be able to ascertain the scope of Claim 18 with reasonable certainty. A POSITA would understand that there is no ambiguity or conflict in having a “data bus that connects the data networking engine to the cable modem engine, wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine” as claimed in Claim 18 of the ‘775 Patent.

VIII. '690 PATENT

A. Overview of the '690 Patent

119. The '690 Patent is titled "Receiver Determined Probe" and was filed on December 10, 2009, and issued on October 9, 2012. The '690 Patent claims priority to U.S. Provisional Application No. 61/122,687 dated December 15, 2008, and U.S. Provisional Application No. 61/179,454 filed on May 19, 2009. Accordingly, for my analysis herein, I have assumed the date of December 15, 2008 as the earliest possible priority date for the '690 Patent.

120. The '690 Patent is directed at aiding in the diagnosis of "*problems with subscriber services*." '690 Patent, 1:31–34 (emphasis added). The '690 Patent explains that there has been an "increase in the number of services and devices" offered through home networks which "increases the complexity of coordinating communication between the network nodes as each node may experience different access conditions along its portion of the network." *Id.* at 1:25–29. "This increase in complexity, further increases the likelihood that network problems may develop," and the content providers typically must "send[] a technician to the physical location of the home network to personally assess the network and diagnose the problem." *Id.* at 1:30–36. "[A]s the number of homes with subscriber services incorporated into their home networks increases, so does the amount of resources a service provider must devote to technical support and network maintenance." *Id.* at 36–40.

121. To help aid in the diagnosis of "problems with subscriber services" (*id.* at 1:31–34), the '690 Patent describes the use of probes to "characterize the communication channel over which data is to be sent between nodes in a network," including "various embodiments" in which "nodes on a network are programmed to generate a probe transmission in response to a request from the node that will be receiving the probe." *Id.* at Abstract, 1:41–43.

122. Exemplary “nodes” in a network are illustrated in Figure 1 of the ’690 Patent, which I have annotated below. As shown below, these include nodes at the residence 101, as well as a Service Provider network node 112. *Id.* at FIG. 1, 4:10–24.

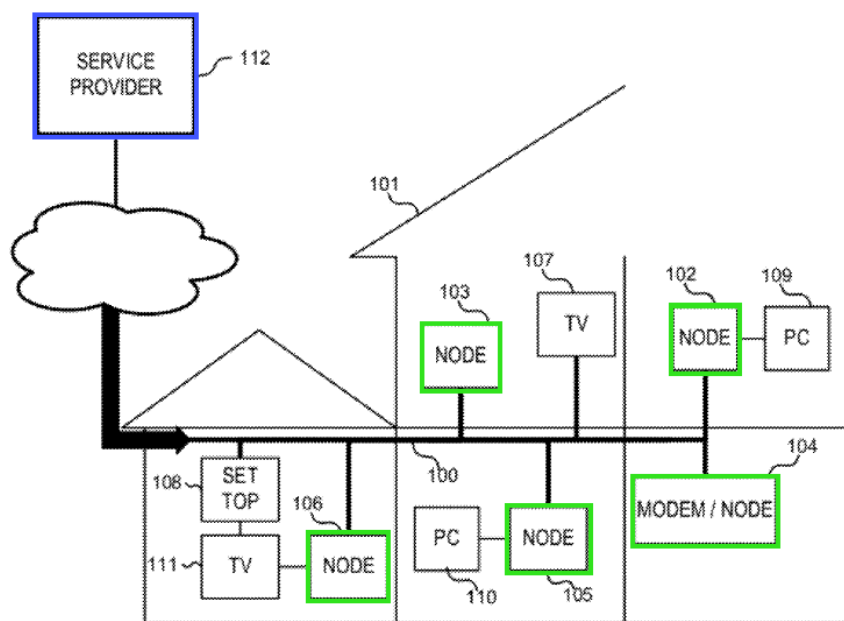


Fig. 1

’690 Patent, FIG. 1 (annotated).

123. According to various embodiments, nodes are “programmed to generate a probe transmission in response to a request from the nodes that will be receiving the probe.” *Id.* at 1:66–2:3. The responsive “receiver determined probe” (also called simply a “probe”) may comprise one or more of a plurality of parameters used for channel assessment, maintenance procedures, and/or off-site network diagnosis. *See id.* at 1:50–51, 4:25–27. *See also id.* at 2:20–27. An exemplary embodiment is shown in Figure 4, reproduced below.

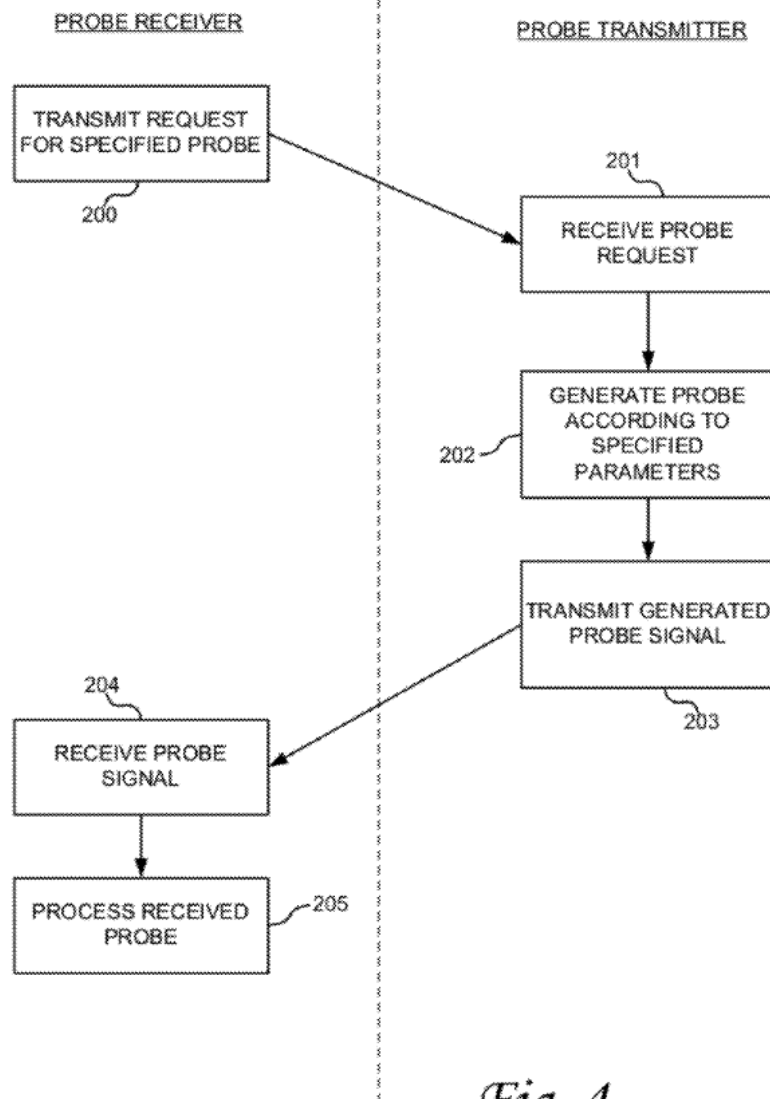


Fig. 4

'690 Patent, FIG. 4

124. The probe request may “specif[y] a plurality of parameters to be used . . . to generate a probe.” *Id.* at 2:3–6. For example, in one embodiment, “at least one of the probe parameters indicates: a) a modulation profile for the probe; b) the payload content of the probe; c) the number of times to transmit the probe; d) the number of symbols for the payload of the probe; e) the preamble type for the probe; f) the cyclic-prefix length for the payload of the probe; g) the transmit power for the probe; and h) the transmit power scaling factor for the payload of the probe.” *Id.* at

2:35–42. In addition, the probe request may specify a plurality of parameters that specify a form of the probe. *Id.* at 2:3–6.

B. Prosecution History of the '690 Patent

125. I have reviewed the prosecution history leading to the issuance of the '690 Patent. I note that Dr. Almeroth does not offer any summary or analysis of the '690 Patent's prosecution history in his Declaration.

126. Notably, during prosecution, the disputed terms discussed below and in Dr. Almeroth's declaration were understood by the Examiner and were not rejected as indefinite.

C. Disputed Terms of the '690 Patent

127. I understand that there is a dispute over one (1) claim term within Claim 1 and two (2) claim terms within Claim 9 of the '690 Patent. Below, I have reproduced Claims 1 and 9 of the in their entirety and have emphasized the terms that are in dispute.

1. A method comprising:

- a) receiving in a first node, a probe request specifying a first plurality of parameters associated with the generation and transmission of a probe, wherein the first plurality of parameters at least specify content payload of the probe and a second node;
- b) determining a second plurality of parameters associated with generation and transmission of the probe;
- c) *generating the probe in accordance with the first plurality of parameters and the second plurality of parameters, wherein the probe has a form dictated by the first plurality of parameters;* and
- d) transmitting the probe from the first node to the second node.

'690 Patent, Claim 1.

9. A method comprising:

- a) a first node transmitting a probe request to a second node, the probe request specifying a first plurality of probe parameters for a physical layer probe, *the first plurality of probe parameters comprising a form for the probe including a modulation profile for the probe;*

b) the first node receiving the probe from the second node, *wherein the probe is generated in accordance with the first plurality of parameters and in accordance with a second plurality of parameters determined by the second node.*

'690 Patent, Claim 9.

128. I understand Dr. Almeroth opines that the following terms in the '690 patent are indefinite:

- “generating the probe in accordance with the first plurality of parameters and the second plurality of parameters, wherein the probe has a form dictated by the first plurality of parameters” (Claim 1)
- “wherein the probe is generated in accordance with the first plurality of parameters and in accordance with a second plurality of parameters determined by the second node” (Claim 9)
- “the first plurality of probe parameters comprising a form for the probe including a modulation profile for the probe” (Claim 9)

Almeroth Decl. ¶ 30.

129. I disagree. As discussed further below, Dr. Almeroth misinterprets the plain and ordinary meaning of these phrases to manufacture an inconsistency that does not exist.

1. “generating the probe in accordance with the first plurality of parameters and the second plurality of parameters, wherein the probe has a form dictated by the first plurality of parameters” (Claim 1)

130. With respect to Claim 1, Dr. Almeroth opines that “generating the probe in accordance with the first plurality of parameters and the second plurality of parameters” is indefinite because it is purportedly incompatible with the phrase “wherein the probe has a form dictated by the first plurality of parameters.” *See* Almeroth Decl. ¶¶ 30, 83–84. This is because, according to Dr. Almeroth, “[b]y definition, the parameters define the form of a probe” and “[a] probe cannot be generated in accordance with ‘the first plurality of parameters’ and the ‘second plurality of parameters,’ but have its form dictated only by the ‘first plurality of parameters’ (as is

covered by the claim.)” Almeroth Decl. ¶ 30; *see also* ¶¶ 80–84. Dr. Almeroth’s full statement from paragraph 30 is reproduced below:

Claim 1 of the ’690 Patent and its dependents are indefinite because “generating the probe in accordance with the first plurality of parameters and the second plurality of parameters” is incompatible with “wherein the probe has a form dictated by the first plurality of parameters.” By definition, the parameters define the form of a probe. A probe cannot be generated in accordance with the “first plurality of parameters” and the “second plurality of parameters,” but have its form dictated only by the “first plurality of parameters” (as is covered by the claim.)

131. I disagree. Dr. Almeroth’s reasoning is based on an incorrect interpretation of the claims. Dr. Almeroth manufactures a requirement that any and all “parameters” relating to the *generation* of the probe necessarily define the *form* of the probe. *See* Almeroth Decl. ¶ 30; *see also* ¶ 84 (“By definition, ‘parameters’ define the form of the probe that will be generated”). This is inconsistent with how a POSITA would read the specification and claims of the ’690 Patent.

a. The claim language is clear on its face that not all parameters relate to the “form” of the probe

132. Beginning with the claims as a starting point, Claim 1 plainly recites that there is a first plurality of parameters and a second plurality of parameters “wherein the probe has a form dictated by the first plurality of parameters.” Thus, the language of the claim on its face does not require *all* parameters to dictate the form of the probe.

133. A POSITA would understand that what the claim requires is that parameters are specified in the probe request, and at least one of these parameters (*i.e.*, the first plurality) dictates the form of the probe. A POSITA would understand that the other parameters (*i.e.*, the second plurality and any additional parameters) need not specify the form of the probe.

134. My findings are further supported by the claim language in Claim 9, wherein Claim 9 similarly recites a “first plurality of probe parameters” specified by the probe request and a “second plurality of parameters determined by the [node which generates the responsive probe].”

Only the first plurality of probe parameters is said to “compris[e] a form for the probe.” *See* ’690 Patent, Claim 9. A POSITA would therefore understand that the parameters “determined by the [node which generates the responsive probe]” need not comprise a form for the probe.

135. It should also be noted that both Claim 1 and Claim 9 make a distinction between parameters that are *specified* in the probe request (such as the first plurality) and parameters that are *determined* (the second plurality). In both cases, only parameters that are specified in the probe request are said to relate to the “form” for the probe.

b. The specification further confirms a POSITA’s understanding that not all parameters relate to the “form” of the probe

136. The specification is consistent. For example, the specification recites:

The receiving node may generate a probe request that specifies a plurality of parameters to be used in such a “receiver determined” probe to generate a probe having the “form” specified by these parameters.

’690 Patent, 2:3–6; *see also id.* at 2:17–19 (“the probe that is transmitted in response to the probe request will have a form dictated by the parameters specified in the probe request”).

137. This confirms a POSITA’s understanding of the plain claim language, that the probe request specifies parameters to be used in generating a probe, and the form of the probe is specified by at least one of these parameters (*i.e.*, the first plurality).

138. Furthermore, a POSITA would understand the point of the probe request is for a node to generate a probe containing responsive information—information which can be used, for example, for channel assessment, network maintenance procedures, or off-site network diagnosis. *See id.* at 1:48–52, 4:25–27. *See also id.* at 2:20–27. A POSITA would therefore understand the claimed “second plurality of parameters” could, for example, include such responsive information. This is made clear in Claim 9, which expressly recites “a second plurality of parameters *determined by the second node.*” These second plurality of parameters may be the parameters that are, for

example, returned in the payload of the probe and which do not necessarily determine the “form” of the probe.

c. Dr. Almeroth fails to show support for his view that all parameters define the “form” of the probe

139. Dr. Almeroth asserts “[b]y definition, ‘parameters’ define the form of the probe that will be generated.” Almeroth Decl. ¶ 84; *see also* ¶ 30. I disagree. The only support Dr. Almeroth cites for this conclusion is column 2, line 6, which reads in full context: “[t]he receiving node *may* generate a probe request that specifies a plurality of parameters to be used in such a ‘receiver determined’ probe to generate a probe having the ‘form’ specified by these parameters.” ’690 Patent, 2:3–6 (emphasis added).

140. Based on my review and understanding of the specification, there is nothing in the above-mentioned passage (’690 Patent 2:3–6), that a POSITA would understand as limiting the “form.” The specification makes clear that “the receiving node *may* generate a probe request” wherein the responsive probe has a “‘form’ specified by” *e.g.*, according to the probe request’s one or more parameters that “may” include a “form” parameter. For example, the phrase uses the term “may,” which is permissive and indicates that an exemplary embodiment is being described. There is also no indication of the Applicant’s express intent to define the term “form.” The passage does not state that form “is” or “means” something. Furthermore, the passage refers only to “these parameters,” as in the plurality of parameters specified in the probe request. The passage gives no indication that other parameters (such as those determined by the probe-generating node) must also specify the form of the probe. As such, nothing here is inconsistent with the plain language of Claims 1 and 9.

141. A POSITA would find no support for Dr. Almeroth's view that "generating the probe in accordance with the first plurality of parameters and the second plurality of parameters" is incompatible with "the probe has a form dictated by the first plurality of parameters."

142. Based on the plain language of Claim 1, a POSITA could ascertain the scope of the claim with reasonable certainty. For example, a POSITA could ascertain, with reasonable certainty, whether a probe request specifies parameters, whether a probe is generated in accordance with those parameters, whether the probe is generated in accordance with a second plurality of parameters, and whether the probe has a form dictated by at least one of the parameters specified in the probe request.

143. For each of the reasons set forth above, it is my opinion that Dr. Almeroth has not shown that the scope of Claim 1 of the '690 Patent is not reasonably certain or is indefinite. *See also ¶¶ 144–152, infra.*

2. "wherein the probe is generated in accordance with the first plurality of parameters and in accordance with a second plurality of parameters determined by the second node" (Claim 9) / "the first plurality of probe parameters comprising a form for the probe including a modulation profile for the probe" (Claim 9)

144. According to Dr. Almeroth, Claim 9 is also indefinite for nearly the same reasons he opines that Claim 1 is indefinite. Dr. Almeroth's opinion, from paragraph 30 of his Declaration is reproduced below:

Claim 9 of the '690 Patent and its dependents are indefinite because "wherein the probe is generated in accordance with the first plurality of parameters and in accordance with a second plurality of parameters determined by the second node" is incompatible with "the first plurality of probe parameters comprising a form for the probe including a modulation profile for the probe." By definition, the parameters define the form of a probe. A probe cannot be generated in accordance with the "first plurality of parameters" and the "second plurality of parameters," but have only the "first plurality of parameters" comprise its form (as is covered by the claim.)

145. I disagree. For the reasons discussed above, Dr. Almeroth is incorrect that “[b]y definition, the parameters define the form of a probe.” *See e.g.*, ¶¶ 130–140, *supra*. A POSITA would not understand column 2, line 6 as defining or requiring all parameters to define the form of the probe. The language in that passage is permissive and exhibits no clear intent to define any term.

a. A POSITA would understand, in view of the intrinsic evidence, that not all parameters “compris[e] a form for the probe”

146. Further, the claim language makes clear that not all parameters must “compris[e] a form for the probe.” Claim 9 recites “*the first plurality of probe parameters* comprising a form for the probe.” A POSITA would understand the use of “comprising” to mean that other parameters can also be included in the “first plurality,” in addition to the parameter(s) that specify a form for the probe. Dr. Almeroth’s opinion improperly attempts to convert the open-ended “comprising” language to closed-ended “consisting of” language.

147. Dr. Almeroth also asserts that—because Claim 9 does not expressly recite the second plurality of parameters comprising a form for the probe—the claim (according to Dr. Almeroth) requires that *only* the first plurality of parameters determine the form. *See* Almeroth Decl. ¶ 84 (“the claims appear to cover the form of the probe being determined only by the parameters sent by the requesting node”). I disagree with his importation of the limitation “only.” Claim 9 uses “comprising,” indicating that the elements listed are necessary to satisfy the claim, but additional limitations can be added.

148. Thus a POSITA would not find it incompatible, based on the plain and ordinary meaning of the claim language, for a probe to be generated in accordance with the first and second plurality of parameters, wherein “the first plurality of probe parameters compris[es] a form for the probe.”

149. In my opinion, a POSITA would be able to reasonably ascertain the scope of Claim 9 based on the plain and ordinary meaning of the claim language. For example, a POSITA would not have any difficulty ascertaining “wherein the probe is generated in accordance with the first plurality of parameters and in accordance with a second plurality of parameters determined by the second node.” A POSITA would also not have any difficulty determining whether “the first plurality of probe parameters compris[es] a form for the probe including a modulation profile for the probe.”

b. Among other things, Dr. Almeroth is incorrect that “both the requesting node and the transmitting node separately determine a ‘plurality of parameters’” as if Claim 1 and Claim 9 are the same in this regard

150. I also note Dr. Almeroth asserts that Claims 1 and 9 require “both the requesting node and the transmitting node [to] separately *determine* a ‘plurality of parameters associated with the generation’ of the probe.” Almeroth Decl. ¶ 83 (emphasis added). I disagree. Claim 1 recites a method comprising “determining a second plurality of parameters associated with the generation and transmission of the probe” not Claim 9. Further, Claim 1 does not specify which node determines these parameters.

151. In addition, the claims do not require the requesting node (*i.e.*, the node that transmits the probe request) to *determine* a plurality of parameters. Rather, Claims 1 and 9 both recite that the probe request *specifies* a plurality of parameters. Thus, Dr. Almeroth is simply incorrect about what the claims require.

152. Dr. Almeroth also asserts that the Claims 1 and 9 are somehow “unlike the disclosure.” Almeroth Dec. ¶ 83. I disagree. This appears to be more akin to Dr. Almeroth providing an opinion related to the written description versus opining that a POSITA would not understand the claim terms with reasonable certainty. Regardless, as explained above, Dr.

Almeroth incorrectly interprets the claims, rendering his conclusion that the claims are unlike the disclosure also incorrect.

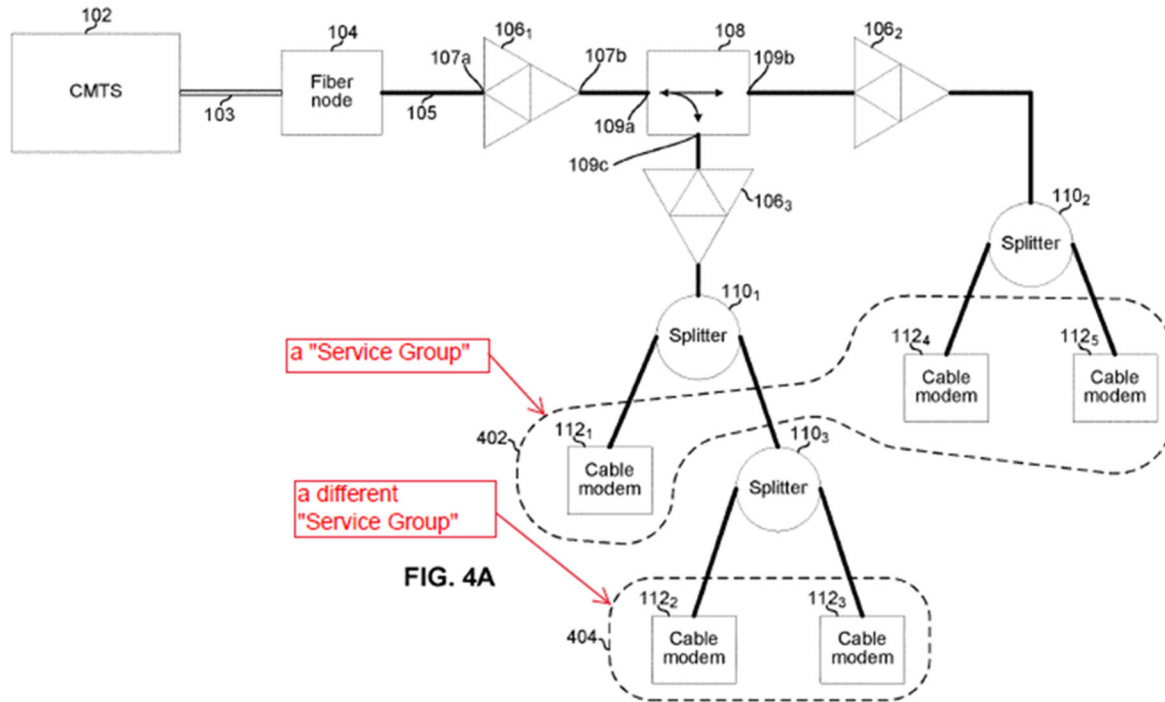
153. For each of the reasons set forth above, it is my opinion that Dr. Almeroth has not shown that the scope of Claim 9 of the '690 Patent is not reasonably certain or is indefinite.

IX. '682 PATENT

A. Overview of the '682 Patent

154. The '682 Patent is titled "Method And System For Service Group Management In a Cable Network" and was filed on January 9, 2018, and was issued on November 20, 2018. The '682 Patent claims priority to U.S. Application No. 15/434,673, filed on February 16, 2017 (now U.S. Patent No. 9,866,438), U.S. Application No. 15/228,703, filed on August 4, 2016 (now U.S. Patent No. 9,577,886), U.S. Application No. 13/948,444, filed on July 23, 2013 (now U.S. Patent No. 9,419,858), and U.S. Provisional Application No. 61/674,742, filed on July 23, 2012. Accordingly, for my analysis herein, I have assumed the date of July 23, 2012 as the earliest possible priority date for the '682 Patent.

155. The '682 Patent describes and claims a method and system for a "cable modem termination system (CMTS) [to] determine, for a plurality of cable modems served by the CMTS, a corresponding plurality of SNR-related metrics." '682 Patent, Abstract. The specification describes how the CMTS may assign cable modems ("CMs") into service groups based on the SNR-related metrics, where SNR means signal-to-noise ratio. In general, SNR is a ratio measurement of the (level of) signal to the (level of) noise with respect to the signal between the CMTS and CM. An exemplary system showing a CMTS and CMs is shown below in Figure 4A:



'682 Patent, FIG. 4A (annotated); *see also* 6:42–7:22, FIG. 4B.

156. Accordingly, the '682 Patent discloses that the CMTS builds a composite view of the various cable modems' SNR-related levels (*e.g.*, worst case SNR levels), wherein the '682 Patent calls these various SNR-related levels "SNR profiles." *Id.* at 3:53–58 ("SNR at a particular frequency or SNR over a range of frequencies (an SNR profile).").

157. The specification of the '682 Patent, as an example, describes that a plurality of CMs that share similar SNR-related metrics within a "service group" are said to have a "composite [worst-case] SNR profile for a [particular] service group." *Id.* at 4:14–17, 5:7–12.

B. Prosecution History of the '682 Patent

158. I have reviewed the prosecution history leading to the issuance of the '682 Patent. I note that Dr. Almeroth does not offer any summary or analysis of the '682 Patent's prosecution history in his Declaration.

159. Notably, during prosecution, the disputed terms discussed below and in Dr. Almeroth's declaration were understood by the Examiner and were not rejected as indefinite.

Furthermore, during prosecution, the Examiner not only understood the disputed terms and did not reject them as indefinite, but specifically cited to one of the disputed term as one of the reasons that this claim was allowable over prior art. *See* Exhibit D, 04/03/2018 Non-Final Rejection, 24–27 (ENTROPIC_CHARTER_0005329–0005332).

C. Disputed Terms of the '682 Patent

160. I understand that there is a dispute over two (2) claim terms within Claim 1 of the '682 Patent. Below I have reproduced Claim 1 in its entirety, and have emphasized the terms that are in dispute.

1. A method comprising:

determining, by a cable modem termination system (CMTS), for each cable modem served by said CMTS, a corresponding signal-to-noise ratio (SNR) related metric;

assigning, by said CMTS, each cable modem among a plurality of service groups based on a respective corresponding SNR-related metric;

generating, by said CMTS for each one of said plurality of service groups, *a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics corresponding to said one of said plurality of service groups*;

selecting, by said CMTS, one or more physical layer communication parameter to be used for *communicating with said one of said plurality of service groups* based on said composite SNR-related metric; and

communicating, by said CMTS, with one or more cable modems *corresponding to said one of said plurality of service groups* using said selected one or more physical layer communication parameter.

'682 Patent, Claim 1.

1. “a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics”

161. I understand that Charter asserts that the term “a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics” is indefinite because there is no way to determine what “a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics” means and has provided the expert opinion

of Dr. Almeroth in support of its position. I disagree and set forth my rebuttal herein. As discussed further below, it is my opinion that Dr. Almeroth has not identified any ambiguities or lack of reasonable certainty in the claims when considered in light of the intrinsic record.

a. I disagree that “worst case” and “composite worst case SNR” are the “same thing” in the context of Claim 1 or are otherwise indefinite

162. Dr. Almeroth begins by explaining his understanding of the disclosure of the '682 Patent. *See* Almeroth Decl. ¶¶ 85–91. He contends that the “composite worst-case SNR profile” for a service group is “the worst case SNR for [each] subcarrier among the CMs in that particular service group.” *See* Almeroth Decl. ¶ 89 (quoting '682 Patent, 5:42–46).

163. Dr. Almeroth then provides an example of how he understands the “composite worst-case SNR profile” to be determined: “if there are 5 cable modems (CM[A] - CM[E]) in a hypothetical service group, the ‘composite worst-case SNR profile’ for that service group reflects the worst SNR of all the cable modems in the service group for each subcarrier . . . In this example, CM[A] has the worst SNR at subcarriers 2, 5 and 7, CM[B] has the worst SNR at subcarrier 1, CM[C] has the worst SNR at subcarrier 6, CM[D] has the worst SNR at subcarriers 3 and 8, and CM[E] has the worst SNR at subcarrier 4.” Almeroth Decl. ¶ 90. Dr. Almeroth annotates Figure 2B to support his example:

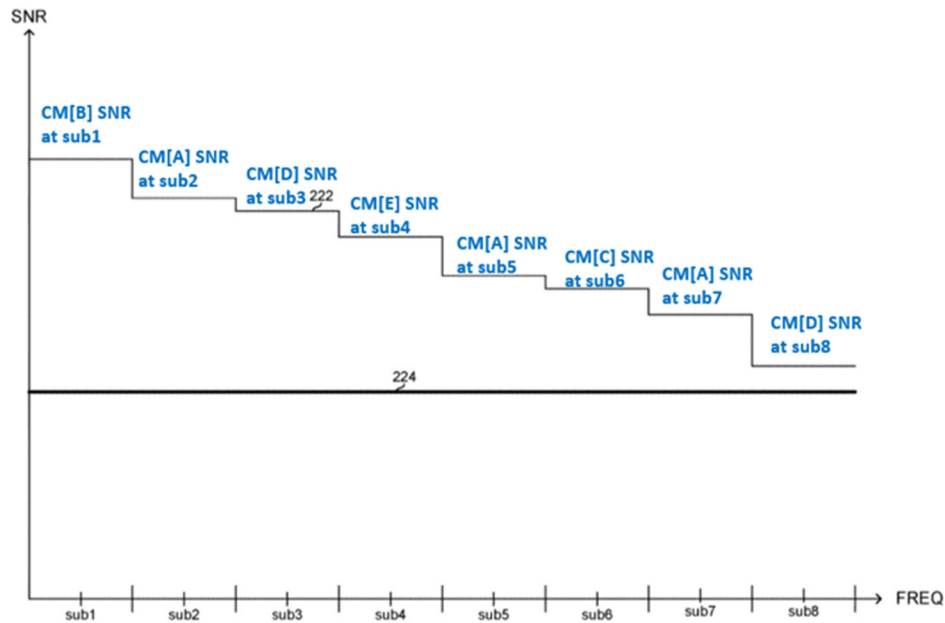


FIG. 2B

Almeroth Decl. ¶ 90.

164. Dr. Almeroth’s example and annotations of Figure 2B misrepresent what the specification says about what is being described in Figure 2B. Specifically, Dr. Almeroth appears to be arguing that the steps each relate to a single CM’s worst SNR, and that those worst SNRs are used to determine the “composite worst-case SNR profile.” Almeroth Decl. ¶ 90.

165. However, the specification makes clear that “line 222 in FIG. 2B represents *a composite* worst-case SNR profile for one or more CM(s) in the HFC network to which the message 202 is destined.” ’682 Patent, 4:9–12 (emphasis added). The specification further explains that while the CMs report their SNR readings, only the CMTS can build a composite view of all reporting CMs based on the collective CM readings. *Id.* at 4:40–56. From that information, the CMTS assigns CMs into service groups. *Id.*

166. The specification further explains, that the exemplary profile line 222, is based on a “minimum desired headroom” “228” needed to reliably have a robust enough signal to overcome

the noise, the CMTS accordingly selects corresponding “physical layer [communication] parameters” to ensure reliable communications with each CM within a service group. ’682 Patent, 5:13–20. A POSITA would understand that this means that the exemplary line 222 in Figures 2B and 2C shows the ceiling that the CMTS must transmit at for all CMs in the entire service group to reliably communicate. Below I reproduce Figure 2C of the ’682 Patent for further clarification:

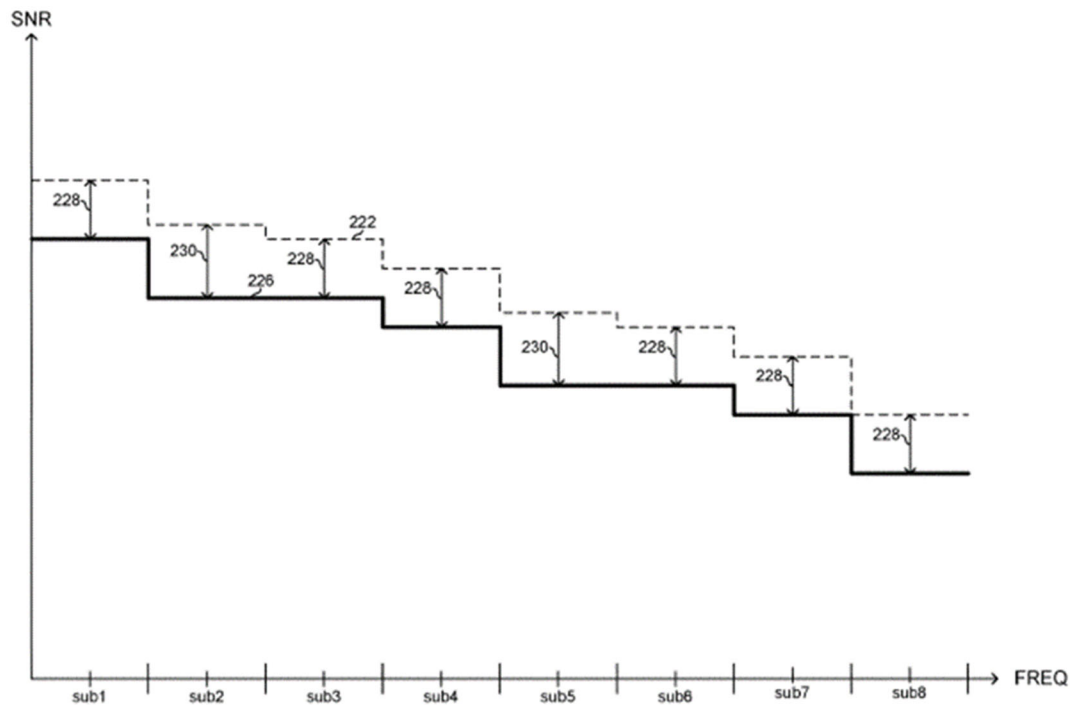


FIG. 2C

167. The rest of Dr. Almeroth’s opinion focuses on how “composite worst-case SNR profile” does not have a plain and ordinary meaning. He concludes that “[t]here is no way to know how the ‘composite SNR-related metric’ can be ‘based *at least in part on*’ the ‘worst-case SNR profile’ since the two refer to the same thing.” See Almeroth Decl. ¶ 96 (emphasis in original).

168. Dr. Almeroth’s opinion mischaracterizes the difference between a “composite SNR-related metric” and a “worst-case SNR profile.” The specification describes the “composite SNR-related metric” and “a worst-case SNR profile” as different things. While the specification describes how “worst-case SNR profile” must be a profile that in some way takes into account the

worst-case SNR of a cable modem or a service group, a “composite SNR-related metric” need not inherently involve worst-case SNR. ’682 Patent, 4:3–20, 4:43–5:6, 5:7–20.

169. The ’682 Patent discusses the *composite SNR-related metric* as being a composite of metrics in the context of worst-case SNR because that is part of the disclosed invention: in one embodiment, using the worst-case SNR in this way could allow for more efficient utilization of an HFC network to improve its overall data throughput and better overall data throughput for the cable modems in that network. ’682 Patent, 5:40–57; *see also id.* at 4:25–28. Accordingly, the *composite SNR-related metric* could also include the **best-case** SNR, an **average** SNR, or some other SNR-related metric entirely. Claim 1 of the ’682 Patent discloses and the specification teaches that a *composite SNR-related metric* need only be based “at least in part on a worst-case SNR profile.” ’682 Patent Claim 1, 4:25–28, 5:42–46. The *composite SNR-related metric* could also be based in part on other SNR profiles or SNR-related metrics. *Id.*

b. I disagree with Dr. Almeroth’s opinion that “worst case” SNR is unintelligible or always 0 in the context of Claim 1

170. Dr. Almeroth similarly misconstrues what “worst-case” means. *See* Almeroth Decl. ¶ 94. Dr. Almeroth contends, without any explanation, that the “worst case” SNR will always be an SNR of 0, and thus a “worst-case SNR profile” would contain only 0s and consequently be unintelligible. His position seems to be that because an SNR profile of only 0s is nonsensical, a “worst-case SNR profile” must actually be referring to a “composite worst-case SNR profile.” Almeroth Decl. ¶ 94. Dr. Almeroth’s position would require one to assume (erroneously so) that SNR is a static value unrelated to data throughput. Even so, neither the ’682 Patent specification nor the claims requires that a “worst case” SNR always be zero.

171. Taken together, Dr. Almeroth’s mischaracterization of the individual terms making up the claim term “a composite SNR-related metric based at least in part on a worst-case SNR

profile of said SNR-related metrics” is an attempt to create ambiguity and indefiniteness where there is none.

172. Thus, it is my opinion that there is no ambiguity regarding how to determine “a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics.” The specification clearly teaches that the purpose of the composite SNR is to group modems, at least in part, by composite SNR performance such that one modem with a lower performance does not reduce the potential throughput of every modem in a group. As discussed above, a POSITA would understand that the intrinsic record supports the plain and ordinary meaning such that a *composite SNR-related metric* need only be based at least in part on a *worst-case SNR profile*.

2. “[communicating with/corresponding to] said one of said plurality of service groups”

a. Among other things, Dr. Ameroth is wrong that there is no antecedent basis

173. I understand that Charter asserts that the term “[communicating with/corresponding to] said one of said plurality of service groups” is indefinite because there is no identified or antecedent “one of said plurality of service groups” to which “said one of said plurality of service groups” refers and has provided the expert opinion of Dr. Almeroth in support of its position. I disagree and set forth my rebuttal herein.

174. Dr. Almeroth’s opinion misses the clear antecedent basis in Claim 1

175. In my opinion, the claim term(s) “[communicating with/corresponding to] said one of said plurality of service groups” should be construed according to its plain and ordinary meaning because 1) Dr. Almeroth’s fails to identify the antecedent clearly listed in the prior element of Claim 1, and 2) the meaning of the words as they are read in the content of the full claim are abundantly clear. Dr. Almeroth appears to only write a single paragraph of merely three sentences

and two citations for the proposition that this claim term is indefinite. *See* Almeroth Decl. ¶ 97. Dr. Almeroth's ultimate opinion as to this claim term is that "[t]here is no antecedent in the claim for 'said one of said plurality of service groups,' and there is no way to know which service group among the 'plurality of service groups' is being referred to." *Id.*

176. However, the antecedent basis is clearly contained in the prior claim element. I have emphasized the relevant portions of the claim here to demonstrate that Dr. Almeroth ignores that there are two steps of antecedent basis that the elements rely on:

1. A method comprising:

determining, by a cable modem termination system (CMTS), for each cable modem served by said CMTS, a corresponding signal-to-noise ratio (SNR) related metric;

assigning, by said CMTS, each cable modem among a **plurality of service groups** based on a respective corresponding SNR-related metric;

generating, by said CMTS for each one of said plurality of service groups, a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics corresponding to said one of said plurality of service groups;

selecting, by said CMTS, one or more physical layer communication parameter to be used for communicating with said one of said plurality of service groups based on said composite SNR-related metric; and

communicating, by said CMTS, with one or more cable modems corresponding to said one of said plurality of service groups using said selected one or more physical layer communication parameter.

'682 Patent, Claim 1 (emphasis added).

177. When the claim language is viewed in total, it is clear that there is not only an antecedent basis, but that a POSITA would be able to follow each element of Claim 1 and understand the invention. The specification identifies that an advantageous embodiment would be to perform Claim 1 for as many service groups in the plurality of service groups as preferred in order to achieve superior cable modem performance in the network. '682 Patent, Abstract, 5:40–57.

178. A POSITA would further understand that a composite SNR-related metric generated for service group A, for example, would be the same composite SNR-related metric and same service group in the selecting and communicating elements of Claim 1. Nonetheless, the claimed invention only *requires* communicating with a single service group of the plurality of service groups in the selecting and communicating elements of Claim 1. As such, Dr. Almeroth's assertion that one cannot determine which service group is being referred to does not create any indefiniteness, and the claim term should be construed according to its plain and ordinary meaning.

179. For each of the reasons set forth above, it is my opinion that Dr. Almeroth has not shown that the scope of Claim 1 of the '682 Patent is not reasonably certain or is indefinite.

X. ADDITIONAL REMARKS

180. I currently hold the opinions expressed in this Declaration. But my analysis may continue, and I may acquire additional information and/or attain supplemental insights that may result in added observations. Additionally, it is my understanding that discovery is ongoing in this matter. I reserve the right to rely on additional discovery that occurs after this Declaration is submitted. To the extent that additional information becomes available relevant to the opinions expressed in this Declaration, I will update my opinions as appropriate.

181. I also reserve the right to respond to any additional arguments or opinions raised by Charter or Charter's expert(s). I further reserve the right to respond to any new positions raised by Charter or respond to any further expert declaration provided by Charter regarding claim construction issues.

I hereby declare that all statements made are of my own knowledge are true and that all statements made on information and belief are believed to be true. I further declare that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of the Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this proceeding.

Dated: April 14, 2023


By:  Ph.D.
Richard A. Kramer Ph.D.
Salem, Oregon

EXHIBIT A

RICHARD A. KRAMER, Ph.D.

Phone: (541) 602-2271

email: Richard.Kramer@SISDevelopment.com

E X E C U T I V E S U M M A R Y

Industry technical expert with 30+ years of solid industry experience as a top-technology leader combined with academic excellence. Top-technology leader in the introduction of new technologies in the areas of: video, video compression/encoding, multimedia, streaming media, network communications, wireless communications, wireless networks, artificial intelligence, machine learning, cryptography, encryption, authentication, digital rights, physical security (video surveillance, cameras, digital video recorders, burglar alarm systems, intelligent locks, monitoring software), Internet / web-based client-server /cloud architectures, advanced software, and data security.

P R O F E S S I O N A L E X P E R I E N C E

SIS DEVELOPMENT INC.

2006-PRESENT

President

- Leader of SIS Development, Inc. (“SIS”) / Security Industry Services Inc. SIS is an engineering and technical services company that serves leading product and software companies.
- Called upon and served as a technical expert for numerous reputable companies/organizations including Sony, Apple, Netflix, Canon, FLIR Systems, ASUS Computer, American Express, US-Department of Justice, and the like.
- Formed a formidable team of leaders, core competency, and technical resources domestically and internationally. Formed strategic partnerships to form a profitable “win-win”.

GENERAL ELECTRIC, GE-SECURITY

2003 - 2007

General Manager – Technology / Vice President, Engineering

Leader of progressive 300+ person technology and engineering organization: 16 organizations in 11 geographically dispersed locations. Responsible for technology development for \$500M+/year in products worldwide for General Electric’s Video Systems Group (VSG) and other advanced Enterprise/Commercial/Residential solutions: video surveillance (IP network video products and software, DVRs, cameras), burglar alarm systems (ITI, CADDX and other lines), burglar alarm monitoring software (MAS), and life-safety markets (access control systems, real-estate mobile keys, smoke detectors, etc.).

- Execution and Innovation - Developed leading-edge new customer solutions, successfully launching 20+ major new products/platforms per year, resulting in double-digit organic market growth.
- Held leading industry market share (90 %+) position in key vertical and unique markets with technically innovative products and software in a wide variety of security applications.

- Strategy Leader of GE FY2005 “Session 2” strategy creation and multiple technical M&A due-diligence teams for numerous acquisition targets. Leader of negotiations: closed numerous key strategic partnerships/agreements. 2005 OM (Operating Margin) +50% above plan.
- High-Performance - Advanced with increasing levels of responsibilities from \$120M to \$500M+ in revenue/year accountability; rated as “Top-20%” talent and nominate/attended executive leadership training at GE’s legendary Jack Welch Executive Training Center.

GM/VP/C-LEVEL ROLES, NEW VENTURES, AND DIVESTITURES 1998-2003

VP Engineering /GM/Officer for start-ups and corporate sponsored diversification ventures

- Ivex Corporation – Launched/Pioneered first IP network video surveillance solution for the security industry (partnered with Loronix, now Verint): Developed an online video monitoring software service and the revolutionary IP network video appliance. Successfully acquired by a public entity. Stock went from \$3.60 to \$8.60 within 30 days.
- Home Wireless Networks - Built team/leader of R&D for world’s first combined voice plus data wireless home gateway. Products “Bell” approved. Launched under BellSouth and MCI brands. Launched first low-cost 802.11 access point by Telenor in Europe. Acquired.
- Miraxis; parent EMS TECHNOLOGIES, \$309M (Acquired by Honeywell); corporate technology diversification new business based on new network and wireless Ka-band combined 2-way wireless WAN/Internet/video connectivity and DTH/DBS video distribution satellite technology.

SCIENTIFIC-ATLANTA, BROADBAND COMMUNICATIONS DIVISION (\$2.5B)

1995 – 1998

(Acquired by CISCO SYSTEMS)

Project Director, Advanced Video Systems (AVS) 1997-1998

Engineering Manager, Home Communications Terminals 1996-1997

Engineering Manager, 8600x 1995-1996

Led director-level cross-functional team developing next generation interactive TV (iTV) 2-way video cable set-top boxes to replace \$400M/year Advanced Video Systems (AVS) broadband products. Built engineering department and provided daily direction to multi-disciplined engineering department responsible for S-A’s highest revenue earning product, the 8600x cable set-top. Direct engineering management responsibility for AVS high-volume domestic set-tops, remote controls and third-party partnerships.

- Engineering manager for consumer iTV video products – the company’s highest revenue-earning product lines (\$200M/year) with volumes over 1M+/year (8600x, 8600, etc.).
- Reversed 10-year legacy of re-branding Panasonic set-tops by successfully building new engineering organization and launching the company’s first successful

internally designed high-volume, low-cost product. Volumes reached 80K/month. Reduced COGS (Cost of Goods Sold) by 40%, from \$154 to \$78.

- Spearheaded the launch of the company's first high-volume product to be built in a new company owned factory in Mexico. Proactively developed processes and infrastructure.
- Led the introduction of new development processes and successfully completed business plans, product definitions, ROI (Return on Investment) analysis, forecasts, and resource plans for next-generation set-top products to replace the existing \$400M/year broadband AVS products.
- Managed daily design engineering activities and contract manufacturing support with international third-party partners: Panasonic, WKK and others.

SCHLUMBERGER INDUSTRIES, EMNA (\$14B, NYSE: SLB) 1987 – 1995
(Acquired by ITRON)

Engineering Manager, Residential and Commercial Metering 1994-1995
Hardware Manager, Recorders, and Translation Systems 1990-1994
Senior Electronic Design Engineer 1989-1990
Electronic Design Engineer 1987-1989

Engineering manager for Schlumberger's Electricity Management, North America (EMNA) division. Managed supervisors, multi-disciplined developers and Quality Assurance/Software Quality Assurance personnel developing high-volume electronic communication products, meter reading, modems and power monitoring equipment used by the electric utility industry to monitor and control power on the power grid.

- Designed working ASIC (Application Specific Integrated Circuit) on first pass. Granted two patents.
- As a hands-on developer, primary designer for division's top two highest priced products (Gross Margin: 55%, Average Sales Price: \$2,000).
- Managed R&D organization for residential and commercial product lines, obtaining over \$60M/year in revenue with product line volumes ranging from 10Ks/year to 100Ks/year.
- Promoted, dynamically improved, and launched division's highest revenue product (the "Vectron") after a two-year delay within another R&D organization.
- As hardware manager, launched new product lines that spawned new services business.
- Annually selected to participate in the "Best Program" for high potential managers.

BABCOCK & WILCOX, NUCLEAR POWER DIVISION

1984 - 1987

Electronic Design Engineer / Sr. Electronics Design Engineer

As part of the “Special Products and Integrated Field Services” team, I was a designer and developer of electronic inspection systems and robotic repair systems for nuclear power plant components inside the nuclear containment building.

- Provided system, circuit and software design for advanced video/CCTV, ultrasound, and other imaging solutions to inspect radioactive components inside the nuclear containment building.
- Board level designer of electronic hardware using a multitude of CPU/MPUs, high-speed communication interfaces, control circuits, and complex test/measurement ADC circuits.
- Software programmer using high-level software programming languages and assembly code firmware for robotic/automation repair and inspection equipment.

E D U C A T I O N

Ph.D. in Electrical and Computer Engineering, GPA: 4.0

2022

Oregon State University

Corvallis, Oregon

Research areas and interests include: video, video streaming technologies, video compression (encoding / decoding), optimization of video streaming content transmission, network coding, wireless communications, artificial intelligence / machine learning / reinforcement learning (including algorithms, classifiers, prediction, video analytics), security (including cryptography, encryption, data security, physical security).

Dissertation: “Machine Learning Bandwidth Optimization of Interactive Live Free-Viewpoint Multiview Video for Sporting Events,” Oregon State University.

Graduated Top of Class (4.0 GPA)

Master of Science in Electrical and Computer Engineering, GPA: 4.0

2017

Oregon State University

Corvallis, Oregon

Research areas and interests include video, video compression (encoding/decoding), optimization of video streaming content transport, network coding, video streaming, wireless communications, cryptography, encryption, and data security.

Thesis: “Optimization of Interactive Live Free Viewpoint Multiview Video Streaming Bandwidth,” Oregon State University.

Graduated Top of Class (4.0 GPA)

Bachelor of Science in Electrical Engineering, Magna cum laude **1984**

The University of Toledo

Toledo, Ohio

Member Tau Beta Pi Engineering Honor Society

Executive MBA, 12 Credit Hours

Attended 2003

Emory University, Goizueta Business School

Atlanta, Georgia

The executive business program was ranked in the top 10 globally by Business Week and The Financial Times.

C E R T I F I C A T I O N S , A F F I L I A T I O N S & O T H E R T R A I N I N G

Proficient trained software/source code programmer using the following software languages/systems: MATLAB, Object Oriented, C, C++, Java, FORTRAN, MIRCL (“Multiprecision Integer and Rational Arithmetic C/C++ Library” which is a software library used for developing encryption and authentication algorithms), and numerous assembly languages for both RISC (Reduced Instruction Set Computer) and CISC (Complex Instruction Set Computer) processors.

Member, IEEE (Institute of Electrical and Electronic Engineers).

Member Phi Kappa Phi Honor Society – Lifetime Member

Java 2, Sun Certified Programmer.

GE Six Sigma, Black Belt Training Certified.

Additional post-graduate studies and/or certificates: DSP (Digital Signal Processing) and computer architecture, finance, project management, leadership training.

P A T E N T S

U.S. Patent No. 5,701,253 - Isolated Current Shunt Transducer; December 23, 1997.

U.S. Patent No. 5,422,939 - Parallel Off-Hook Detection for Both Line Available and Phone Pick-up Detection, June 6, 1995.

A C A D E M I C W O R K (P U B L I S H E D A N D N O N - P U B L I S H E D)

1. Richard A. Kramer, Dissertation: “Machine Learning Bandwidth Optimization of Interactive Live Free-Viewpoint Multiview Video for Sporting Events,” Oregon State University, May 17, 2022 (presented, June 15, 2022).
2. Richard A. Kramer, Thinh Nguyen, “Optimization of Interactive Live Free Viewpoint Multiview Video Streaming Bandwidth”, Proceedings of SAI Intelligent Systems

Conference, IntelliSys 2018: Intelligent Systems and Applications pp. 641-657 (presented, September 6, 2018, London, UK).

3. Richard A. Kramer, Jin Phoy Rhee, "The Need, Advances and Challenges Related to Wireless Body Area Network Communications Technology", Oregon State University, June 6, 2017 (presented, June 8, 2017).
4. Richard A. Kramer, Aashutosh Y. Taikar, Warit Paweenbampen, Haya Alorayj, Surabhi Tushar Godambe, "The Challenges and Advances in Mixed Reality Video Technology", Oregon State University, June 7, 2017 (presented, June 7, 2017).
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6. Richard A. Kramer, Thesis: "Optimization of Interactive Live Free Viewpoint Multiview Video Streaming Bandwidth", Oregon State University, April 10, 2017 (presented April 10, 2017).
7. Richard A. Kramer, Mathias Elmlinger, Abhishek Ramamurthy, Siva Pranav Kumar Timmireddy, "A Comprehensive Review of the Challenges and Opportunities Confronting Cache Memory System Performance", Oregon State University, March 13, 2017 (presented March 16, 2017).
8. Richard A. Kramer, Presentation/Lecture: "ESIGN and Other RSA Alternative Signature Schemes", Oregon State University, February 8, 2017.
9. Richard A. Kramer, ESIGN, ECDSA, ED25519 Cryptographic Signature Software Code, January 16, 2017.
10. Richard A. Kramer, "A Survey of ESIGN: State of the Art and Proof of Security" (re-issue with full implementation, performance testing and data analysis), Oregon State University, January 16, 2017.
11. Richard A. Kramer, "The Insecurity of Libcrypts's PRG", Oregon State University, February 9, 2017.
12. Richard A. Kramer, "A Survey of ESIGN: State of the Art and Proof of Security", Oregon State University, November 7, 2016.
13. Richard A. Kramer, Presentation/Lecture: "Secure Audit Logging Systems with Privacy Preservation", Oregon State University, October 25, 2016.
14. Richard A. Kramer, "Efficient Multimedia Distribution in Source Constraint Networks", Oregon State University, November 3, 2015.
15. Richard A. Kramer, "An Analysis of Dynamic Flow Scheduling for Data Center Networks", Oregon State University, August 27, 2015.

16. Richard A. Kramer, “An analysis for the paper: Interactive Streaming of Stored Multiview Video Using Redundant Frame Structures”. Oregon State University, December 22, 2015.
17. Richard A. Kramer, “An analysis for the paper: Video Streaming with Network Coding”, Oregon State University, November 2, 2015.
18. Richard A. Kramer, Presentation/Lecture: “Hedera – An Analysis of Dynamic Flow Scheduling for Data Center Networks”, Oregon State University, October 25, 2015.
19. Richard A. Kramer, “An Analysis of Cloud Based Data Centers Costs”, Oregon State University, August 27, 2015.

EXHIBIT B

8293037

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

September 09, 2022

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APPLICATION NUMBER: 10/675,566
FILING DATE: *September 30, 2003*
PATENT NUMBER: 8223775
ISSUE DATE: *July 17, 2012*



Certified by

Kathi

Performing the Functions and Duties of the
Under Secretary of Commerce
for Intellectual Property
and Director of the United States
Patent and Trademark Office



Patent
109822-95

Mail Stop: Patent Application
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450



NEW APPLICATION TRANSMITTAL
UTILITY

Sir:

Transmitted herewith for filing is a **utility** patent application entitled:

**ARCHITECTURE FOR A FLEXIBLE AND HIGH-PERFORMANCE GATEWAY
CABLE MODEM**

Inventors: Gordon G. Li and Yoav Hebron

I. PAPERS ENCLOSED HERewith FOR FILING UNDER 37 C.F.R. § 1.53(b):

- 11 Page(s) of Written Description
- 4 Page(s) of Claims
- 1 Page(s) of Abstract
- 2 Sheets of Drawings ☒ Formal ☐ Informal

II. ADDITIONAL PAPERS ENCLOSED IN CONNECTION WITH THIS FILING:

- ☐ Declaration
- ☐ Power of Attorney: ☐ Separate or ☐ Combined with Declaration
- ☐ Assignment to Conexant Systems, Inc., and Recordation Cover Sheet
- ☐ Information Disclosure Statement, PTO Form 1449 ☐ Copies of Cited References
- ☒ Return Postcard

CERTIFICATE OF MAILING
(37 C.F.R. §1.10)

I hereby certify that this paper (along with any referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as 'Express Mail Post Office To Addressee' in an envelope addressed to Mail Stop: Patent Application, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

EL986038243US
Express Mail Label No.

September 30, 2003
Date of Deposit

109822.000095/426940.01

Troy M. Schmelzer
Name of Person Mailing Paper

[Signature]
Signature of Person Mailing Paper

Patent
109822-95**III. FEE CALCULATION**☐ Applicant claims small entity status under 37 CFR 1.27.

| | | | | | | |
|--|----------|-----------------|----|---|---|---------------------------------|
| BASIC FILING FEE: | | | | | | 750.00 |
| Total Claims | 15 | - | 20 | = | 0 | x \$18.00 \$0.00 |
| Independent Claims | 3 | - | 3 | = | 0 | x \$84.00 \$0.00 |
| Multiple Dependent Claims | \$280.00 | (if applicable) | | | | <input type="checkbox"/> \$0.00 |
| TOTAL OF ABOVE CALCULATIONS | | | | | | \$750.00 |
| Reduction by ½ for Filing by Small Entity. | | | | | | <input type="checkbox"/> \$0.00 |
| Petition to Make Special | | | | | | \$0.00 |
| TOTAL FEES DUE HEREWITH | | | | | | \$750.00 |

IV. PRIORITY - 35 USC § 119(e)☐ Priority of provisional application Serial No. _____, filed on _____, is claimed under 35 USC § 119(e).**V. METHOD OF PAYMENT OF FEES**

- ☐ Attached is a check in the amount of \$_____.
- ☐ Charge Procopio, Cory, Hargreaves & Savitch's Deposit Account No. 50-2075 in the amount of \$_____.
- ☒ Not attached. No filing fee is submitted. [This and the surcharge required by 37 CFR § 1.16(e) can be paid subsequently.]

VI. AUTHORIZATION TO CHARGE ADDITIONAL FEES

The Commissioner is hereby authorized to credit Procopio, Cory, Hargreaves & Savitch's Deposit Account No. 50-2075 for any over payment of fees and to charge the following additional fees by this paper and during the entire pendency of this application to Deposit Account No. 50-2075:

- ☐ 37 CFR § 1.16 (Filing fees and excess claims fees)
- ☐ 37 CFR § 1.17 (Application processing fees)
- ☐ 37 CFR § 1.21 (Assignment recordation fees)

Patent
109822-95

Please send all correspondence to Troy M. Schmelzer at Customer Number 27189:



PROCOPIO, CORY, HARGREAVES
& SAVITCH
530 B Street, Suite 2100
San Diego, CA 92101-4469
(619) 238-1900

Please direct all inquiries to Troy M. Schmelzer, at the above Customer Number.

Respectfully submitted,
PROCOPIO, CORY HARGREAVES
& SAVITCH LLP

Dated: September 30, 2003

By: 

Troy M. Schmelzer
Reg. No. 36,667

U.S. Express Mail No.: EL986038243US
Filing Date: September 30, 2003

PATENT
PCHS Matter No. 109822-95
02CXT0070D

UNITED STATES PATENT APPLICATION
FOR

ARCHITECTURE FOR A FLEXIBLE AND HIGH-PERFORMANCE
GATEWAY CABLE MODEM

INVENTORS:

GORDON G. LI
YOAV HEBRON

PREPARED BY:
PROCOPIO, CORY, HARGREAVES & SAVITCH LLP
530 B STREET
SUITE 2100
SAN DIEGO, CA 92101-4469

PATENT
PCHS Matter No. 109822-95
02CXT0070D

ARCHITECTURE FOR A FLEXIBLE AND HIGH- PERFORMANCE GATEWAY CABLE MODEM

Field of the Invention

[01] The present invention relates to cable modems and, in particular, relates to a cable modem system having a functionally partitioned and flexible architecture.

Background of the Invention

[02] The future gateway cable modem (CM) will provide a wide range of data networking and VoIP services, as exemplified by the requirements for initiatives such as CableHome and PacketCable. The major challenge in designing such a gateway cable modem is integration of these services with the basic cable modem functionality in an efficient and cost-effective. Several objectives need to be met:

[03] **Functional Partitioning.** The gateway cable modem will incorporate a variety of functions beyond the traditional cable modem, including IP routing, network address translation (NAT)/firewall, virtual private network (VPN), web server and VoIP. These functions need to utilize DOCSIS (Data Over Cable Service Interface Specification) services (link-layer transport and QoS) for wide area network (WAN) access. Partitioning these functions along with other cable modem functions among different computational agents is an essential issue in designing a gateway cable modem.

PATENT
PCHS Matter No. 109822-95
02CXT0070D

[04] **Flexibility.** The architecture of the gateway cable modem should be flexible enough to allow independent software development and field-upgrade of gateway value-added services and basic DOCSIS cable modem services. From a development standpoint, the architecture should facilitate different software-partnering models, including all in-house, software components licensing, and OEM vendor-differentiating design. From a multiple system operator (MSO) perspective, it is highly desirable to be able to independently provision, maintain and upgrade revenue-producing gateway services and basic broadband access services.

[05] **Performance.** The gateway cable modem should be able to support a large number of simultaneous data application sessions originated from/terminated on multiple CPE (customer provided equipment) devices. VoIP applications must not be adversely impacted by an concurrent data applications, and the data path for voice packets must be optimized to minimize delay and jitter.

[06] **Cost.** The gateway cable modem chip should have a small incremental hardware cost/functional increase relative to stand-alone cable modem chips.

[07] **Software Re-Use.** It should be possible to carry over existing cable modem software to the new gateway cable modem without major changes. The existing software running on network processors should be easily portable to run on the gateway platform without major adaptation.

[08] The present invention provides a gateway cable modem architecture that meets all of these objectives.

PATENT
PCHS Matter No. 109822-95
02CXT0070D

Summary of the Invention

[09] The present invention provides a gateway cable modem system and architecture that meets the above objectives and provides a highly flexible, high performance system capable of handling multiple cable modem voice, data and networking services.

[10] One embodiment of the invention is a cable modem system comprising a data networking engine that performs data networking functions and a cable modem engine that performs all other cable modem functions, wherein the cable modem engine is completely partitioned from the data networking engine.

[11] Another embodiment of the invention is a cable modem architecture. The architecture includes a cable modem engine having a a DOCSIS PHY layer with a hardware transmitter and receiver, a DOCSIS MAC processor that implements real-time critical MAC functions for both upstream and downstream communications, and a DOCSIS controller implementing VoIP functionality. The architecture also includes a data networking engine implementing all data networking processing and home networking applications. The data networking engine is completely decoupled from the cable modem engine. In one implementation, the VoIP functionality provided by the cable modem is in accordance with the PacketCable specification and the data networking functionality provided by the data networking engine is in accordance with the CableHome specification.

[12] Another embodiment of the invention is a method for providing a flexible and partitioned cable modem gateway. Data and home networking functionality is provided by a data networking engine, and DOCSIS and VoIP functionality is provided by a cable

PATENT
PCHS Matter No. 109822-95
02CXT0070D

modem engine. The data networking engine is partitioned from the cable modem engine so that the data and home networking functionality is completely decoupled from the DOCSIS and VoIP functionality.

[13] Other systems, methods, features and advantages of the invention will be or will become apparent to one with skill in the art upon examination of the following figures and detailed description. It is intended that all such additional systems, methods, features and advantages be included within this description, be within the scope of the invention, and be protected by the accompanying claims.

Brief Description of the Drawings

[14] The components in the figures are not necessarily to scale, emphasis instead being placed upon illustrating the principles of the invention. In the figures, like reference numerals designate corresponding parts throughout the different views.

[15] FIG. 1 is a block diagram of a gateway cable modem architecture according to the present invention.

[16] FIG. 2 is a functional block diagram implementing the cable modem architecture of FIG. 1.

Detailed Description of the Invention

[17] FIG. 1 illustrates a cable modem system architecture 100 according to the present invention. System 100 comprises three major subsystems: cable modem engine 110; data networking engine 120; and advanced crypto engine 130. The functional sub-components of these three-subsystems are illustrated in greater detail in FIG. 2.

[18] Cable modem engine 110 implements the entire DOCSIS cable modem functionality and is further divided into three functional blocks: DOCSIS PHY layer 112; DOCSIS MAC processor 114 and DOCSIS controller 116. DOCSIS PHY layer 112 comprises a hardware transmitter and receiver. In one implementation, it is for a DOCSIS 2.0-compliant PHY. As seen in FIG. 1, DOCSIS PHY layer 112 receives downstream data, transmits upstream data and receives and transmits voice data from/to an external source. In one implementation, the external source is a HFC (hybrid fiber coax) cable employing both fiber optic and coaxial cable as an effective means for delivering combined data, video, voice, CATV and other communications.

[19] Processor 114 implements real-time critical MAC functions for both upstream (US) and downstream (DS) communications. These functions include US and DS synchronization, DS MAC address filtering, DS protocol filtering, US and DS PHS, concatenation, fragmentation, MAP processing, US transmission scheduling, as well as DOCSIS link-layer DES encryption and decryption. Processor 114 receives downstream data from, provides upstream data to and exchanges voice data in both directions with DOCSIS PHY 112. It also receives upstream data from, and exchanges voice data in both directions with, controller 116. To increase downstream throughput, all processing

of DS PDU (protocol data unit) packets is done within processor 114 without involving controller 116. After being processed, DS PDU packets are forwarded by processor 116 directly to data networking engine 120 along path 118, bypassing controller 116. In one implementation, processor 114 is an ARM9TDMI-based RISC processor. In FIG. 2, processor 114 is represented by MAC DS block 152 and MAC US block 154.

[20] Controller 116 receives US PDU packets from data networking engine 120. As previously described, DS PDU packets are forwarded by processor 114 to data networking engine 120 without involvement of controller 116. In one implementation, controller 116 is an ARM940-based RISC processor. Controller 116 implements the following DOCSIS (blocks 200-212) functions: MAC management message (MMM) processing (ranging, registration, UCD, UCC, DCC, DCI, UP-DIS, DSx and BPI+) (functional block 200 of FIG. 2), IGMP, MAC address learning, classification, US protocol filtering (functional block 202 of FIG. 2) and CM IP stack and software downloading. Functional block 204 carries out cable modem IP/UDP functions, functional block 206 carries out SNMP, DHCP, TFTP and TOD functionality and functional block 208 is responsible for cable modem provisioning. Controller 116 also includes a data network engine driver 210 in communication with data network engine 120 and cable MAC driver 212.

[21] In addition, in order to minimize the latency and jitter of voice packets, controller 116 also implements all PacketCable functionality. In FIG. 2, PacketCable functionality is represented by functional blocks 220-228. These PacketCable functions include provisioning (block 220), security and signaling. Functional blocks 222 (voice DSP

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driver), 224 (streamlined IP/UDP/RTP with classification; PHS, IP/LLC filtering) and 226 (voice MAC driver) interface with external voice DSP 119. Additionally MGCP and RTCP functions are provided by functional block 228.

[22] Data networking engine 120 is responsible for all data networking processing including advanced multi-port bridging/routing with NAT/firewall and VPN (block 250) and home networking applications (CableHome, Web Server, etc.) (block 252). In one implementation, the entire embedded portal services (PS) functionality of the CableHome specification is contained within data networking engine 120, with the CableHome functionality being completely decoupled from the PacketCable and DOCSIS functionality provided by cable modem engine 110. As a result of the virtual de-coupling from cable modem engine 110, data networking engine 120 can be independently software-upgraded without impacting the functionality of cable modem engine 110 (and vice versa).

[23] As seen in FIG. 1, data networking engine is capable of additional CPE functionality such as Ethernet, USB and other LAN I/F communications (802.11, Bluetooth, Powerline, etc.), with appropriate CPE drivers 254, 256, 258 being provided to support such communications. Additionally, cable modem engine driver 260 communicates with cable modem engine 110 and functional block 262 provides SNMP, DHCP, TFTP and TOD functionality.

[24] Advanced crypto engine 130 provides hardware support for crypto functions. These include common crypto functions required by the baseline DOCSIS link-layer

security, PacketCable voice security and data-networking security (e.g. VPN). These functions include DES/3DES, AES and HMAC-MD5/SH-1.

[25] The architecture of gateway cable modem 100 addresses the objectives set forth in the “Background” section above as follows:

[26] **Functional Partitioning.** Cable modem 100 completely partitions data networking functions (advanced bridging/routing, NAT/firewall, VPN, web server and CableHome applications) from DOCSIS cable modem functionality. This is accomplished by localizing data networking functions in the data networking engine processor and localizing cable modem functions in the cable modem engine processor. Additionally, PacketCable VoIP functionality (embedded MTA) is implemented within cable modem engine 110 to address the facts that embedded MTA is closely coupled with cable modem MAC services and that the latency and jitter of voice packets needs to be minimized.

[27] **Flexibility.** Since the data networking and cable modem functions are decoupled and implemented in different processors 110 and 120, independent software upgrading and maintenance of these functions is feasible. From a development standpoint, the architecture can facilitate different software-partnering models, such as complete in-house development, software-components licensing and OEM vendor-differentiating design. In particular, data networking engine 120 provides third parties and OEMs with a dedicated computational platform to develop advanced services outside of the baseline cable modem and VoIP/PacketCable services, minimizing their support dependency on the cable modem provider. Moreover, the software architecture within cable modem

engine 110 is designed in a modular way so that the PacketCable E-MTA can be implemented with minimum impact on the cable modem.

[28] **Performance.** System 100 is able to support a large number of simultaneous data-application sessions originated from/terminated on multiple CPE devices. Its performance is enhanced by the pipe-lining nature of system 100: the processing-intensive functions of the cable modem and data networking are rationally distributed among three different processors: DOCSIS MAC processor 114 (ARM#2); DOCSIS controller 116 (ARM#1); and data networking engine 120 (ARM#3), according to their orders in the packet flow. To further boost downstream throughput, the downstream PDU packets are directly forwarded from the DOCSIS MAC processor 114 to the data networking engine 120 without going through DOCSIS controller 116. This is made possible by exploiting the asymmetric nature of the DOCSIS US/DS 152 and 154. In addition, the data path for voice packets is laid entirely within cable modem engine 110 and is optimized to reduce delay and jitter.

[29] **Cost.** A chip implementing cable modem system 100 will have only a small incremental hardware cost/functional increase over current stand-alone cable modem chips. The major cost difference relative to current chips is the addition of another ARM940-type processor to the chip.

[30] **Software Re-Use.** Existing cable modem software may be carried over to system 100 without major or drastic changes. Existing software running on PCD network processors may be easily ported to run on data networking engine 120 without major adaptation.

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[31] While various embodiments of the invention have been described, it will be apparent to those of ordinary skill in the art that many more embodiments and implementations are possible that are within the scope of this invention.

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What is claimed is:

1. A cable modem system comprising:

a data networking engine that performs data networking functions; and

a cable modem engine that performs all other cable modem functions; the cable modem engine being completely partitioned from the data networking engine.
2. A cable modem system as claimed in claim 1, wherein all DOCSIS functions are localized in the cable modem engine.
3. A cable modem system as claimed in claim 2, wherein VoIP functionality is embedded in the cable modem engine.
4. A cable modem system as claimed in claim 1, and further comprising an advanced crypto engine that performs all crypto functions.
5. A cable modem system as claimed in claim 1, wherein the cable modem engine comprises:

a DOCSIS PHY layer;

a DOCSIS MAC processor; and

a DOCSIS controller.

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6. A cable modem system as claimed in claim 5, wherein the DOCSIS PHY layer comprises a hardware transmitter and receiver.

7. A cable modem system as claimed in claim 5, wherein the DOCSIS MAC processor processes downstream PDU packets and forwards the processed packets directly to the data networking engine without the involvement of the DOCSIS controller in order to boost downstream throughput.

8. A cable modem system as claimed in claim 5, wherein all VoIP functionality is implemented in the DOCSIS controller.

9. A cable modem system as claimed in claim 8, wherein the VoIP functionality is in conformance with the PacketCable specification.

10. A cable modem system as claimed in claim 5, wherein the data networking engine is responsible for all data networking processing including advanced multi-port bridging/routing with NAT/firewall and VPN, and home networking applications.

11. A cable modem system as claimed in claim 10, wherein the data networking engine comprises the entire embedded portal services functionality of the CableHome specification.

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12. A cable modem architecture comprising:
a cable modem engine comprising:
a DOCSIS PHY layer comprising a transmitter and receiver;
a DOCSIS MAC processor that implements real-time critical MAC functions for both upstream and downstream communications; and
a DOCSIS controller implementing VoIP functionality; and
a data networking engine implementing all data networking processing and home networking applications, wherein the data networking engine is completely decoupled from the cable modem engine.

13. A cable modem architecture as claimed in claim 12, wherein the DOCSIS controller provides VoIP functionality in accordance with the PacketCable specification, and wherein the data networking engine provides the embedded portal services functionality of the CableHome specification, wherein the CableHome functionality is provided by the data networking engine is completely decoupled from the PacketCable and DOCSIS functionality provided by the cable modem engine.

14. A cable modem architecture as claimed in claim 13, wherein the DOCSIS MAC processor is an ARM9TDMI-based RISC processor, and wherein the DOCSIS controller is an ARM940-based RISC processor.

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15. A method for providing a flexible and partitioned cable modem gateway comprising:

providing data and home networking functionality in a data networking engine;

providing DOCSIS and VoIP functionality in a cable modem engine; and

partitioning the data networking engine from the cable modem engine so that the data and home networking functionality is completely decoupled from the DOCSIS and VoIP functionality.

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ARCHITECTURE FOR A FLEXIBLE AND HIGH-PERFORMANCE GATEWAY CABLE MODEM

Abstract

[32] A cable modem system and architecture. A cable modem engine performs all
5 cable modem functions, and a data networking engine performs all data and home
networking functions. The cable modem engine is completely partitioned from the data
networking engine. DOCSIS and VoIP functionality is implemented in the cable modem
engine. The VoIP functionality may be in accordance with the PacketCable specification.
The data networking functionality provided by the data networking engine may be in
10 accordance with the CableHome specification.

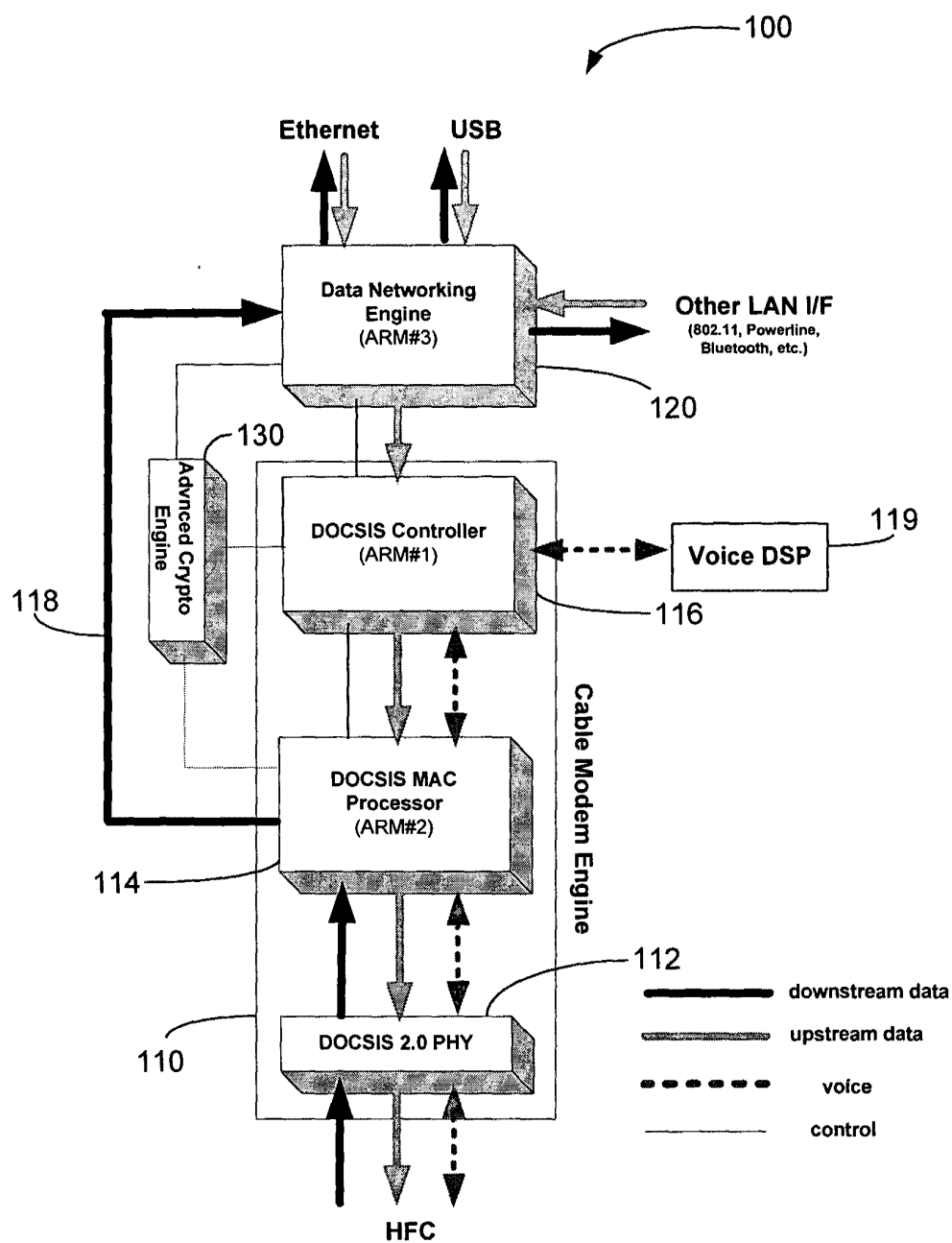


Figure 1

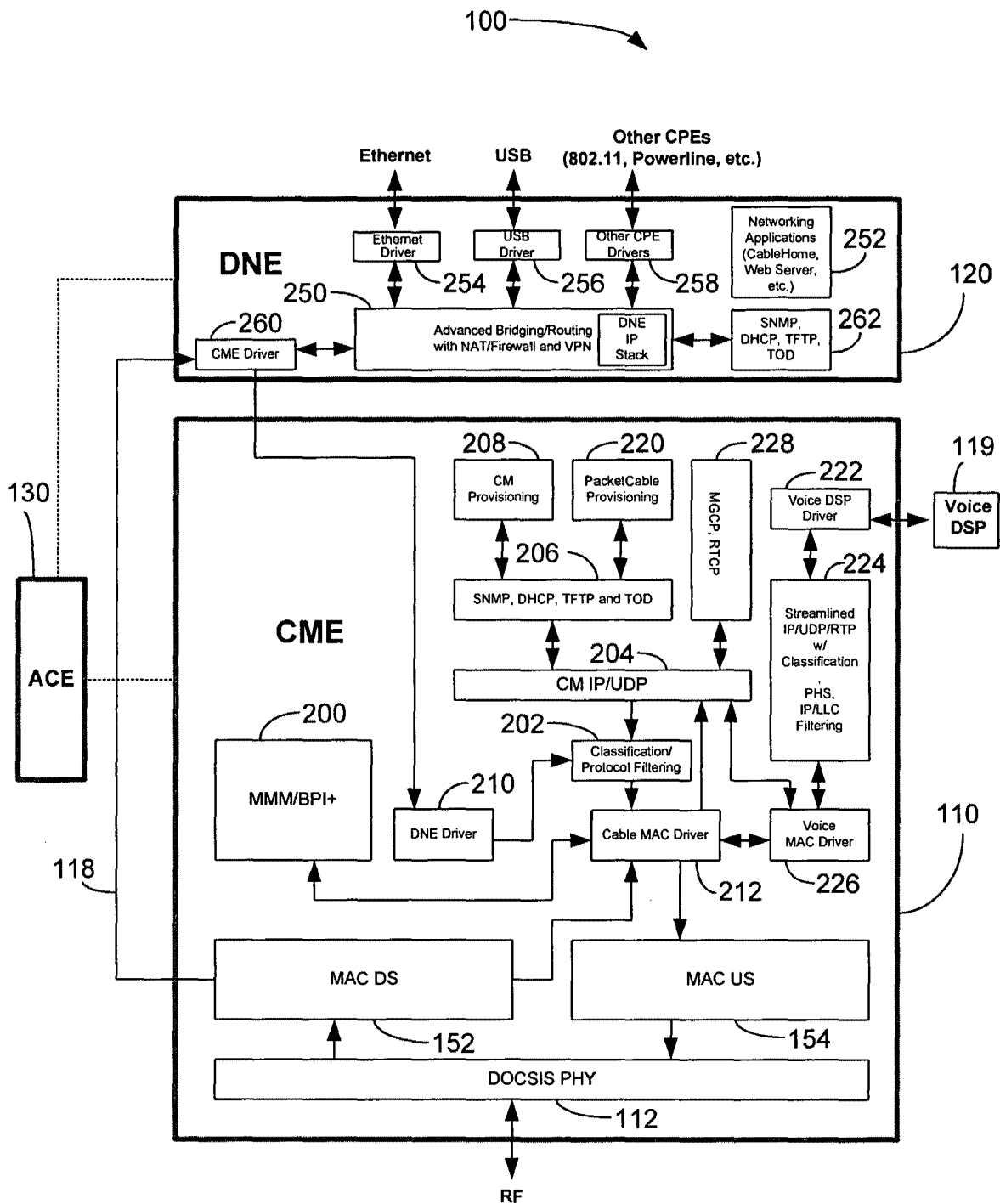


Figure 2

PATENT APPLICATION FEE DETERMINATION RECORD

Effective October 1, 2003

Application or Docket Number

10675566

CLAIMS AS FILED - PART I

(Column 1)

(Column 2)

| | | |
|---|---------------|--------------|
| TOTAL CLAIMS | 15 | |
| FOR | NUMBER FILED | NUMBER EXTRA |
| TOTAL CHARGEABLE CLAIMS | 15 minus 20 = | * |
| INDEPENDENT CLAIMS | 3 minus 3 = | * |
| MULTIPLE DEPENDENT CLAIM PRESENT <input type="checkbox"/> | | |

* If the difference in column 1 is less than zero, enter "0" in column 2

CLAIMS AS AMENDED - PART II

(Column 1)

(Column 2)

(Column 3)

| | | | | | |
|-------------|---|----------------------------------|-------|------------------------------------|---------------|
| AMENDMENT A | | CLAIMS REMAINING AFTER AMENDMENT | | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA |
| | Total | * | Minus | ** | = |
| | Independent | * | Minus | *** | = |
| | FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/> | | | | |

(Column 1)

(Column 2)

(Column 3)

| | | | | | |
|-------------|---|----------------------------------|-------|------------------------------------|---------------|
| AMENDMENT B | | CLAIMS REMAINING AFTER AMENDMENT | | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA |
| | Total | * | Minus | ** | = |
| | Independent | * | Minus | *** | = |
| | FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/> | | | | |

(Column 1)

(Column 2)

(Column 3)

| | | | | | |
|-------------|---|----------------------------------|-------|------------------------------------|---------------|
| AMENDMENT C | | CLAIMS REMAINING AFTER AMENDMENT | | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA |
| | Total | * | Minus | ** | = |
| | Independent | * | Minus | *** | = |
| | FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/> | | | | |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

SMALL ENTITY TYPE ☐

OR

OTHER THAN SMALL ENTITY

| RATE | FEE |
|-----------|--------|
| BASIC FEE | 385.00 |
| X\$ 9= | |
| X43= | |
| +145= | |
| TOTAL | |

| RATE | FEE |
|-----------|--------|
| BASIC FEE | 770.00 |
| X\$18= | |
| X86= | |
| +290= | |
| TOTAL | 770 |

SMALL ENTITY

OR

OTHER THAN SMALL ENTITY

| RATE | ADDITIONAL FEE |
|------------------|----------------|
| X\$ 9= | |
| X43= | |
| +145= | |
| TOTAL ADDIT. FEE | |

| RATE | ADDITIONAL FEE |
|------------------|----------------|
| X\$18= | |
| X86= | |
| +290= | |
| TOTAL ADDIT. FEE | |

| RATE | ADDITIONAL FEE |
|------------------|----------------|
| X\$ 9= | |
| X43= | |
| +145= | |
| TOTAL ADDIT. FEE | |

| RATE | ADDITIONAL FEE |
|------------------|----------------|
| X\$18= | |
| X86= | |
| +290= | |
| TOTAL ADDIT. FEE | |

| RATE | ADDITIONAL FEE |
|------------------|----------------|
| X\$ 9= | |
| X43= | |
| +145= | |
| TOTAL ADDIT. FEE | |

| RATE | ADDITIONAL FEE |
|------------------|----------------|
| X\$18= | |
| X86= | |
| +290= | |
| TOTAL ADDIT. FEE | |



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 www.uspto.gov

| APPLICATION NUMBER | FILING OR 371 (c) DATE | FIRST NAMED APPLICANT | ATTORNEY DOCKET NUMBER |
|--------------------|------------------------|-----------------------|------------------------|
| 10/675,566 | 09/30/2003 | Gordon G. Li | |

27189
 PROCOPIO, CORY, HARGREAVES & SAVITCH LLP
 530 B STREET
 SUITE 2100
 SAN DIEGO, CA 92101

CONFIRMATION NO. 9980

FORMALITIES LETTER



OC000000011576390

Date Mailed: 12/29/2003

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

*Filing Date Granted***Items Required To Avoid Abandonment:**

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
Applicant must submit \$ 770 to complete the basic filing fee for a non-small entity. If appropriate, applicant may make a written assertion of entitlement to small entity status and pay the small entity filing fee (37 CFR 1.27).
- The oath or declaration is missing.
A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(e) of \$130 for a non-small entity, must be submitted with the missing items identified in this letter.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is **\$900** for a Large Entity

- **\$770** Statutory basic filing fee.
- **\$130** Late oath or declaration Surcharge.

Replies should be mailed to: Mail Stop Missing Parts
 Commissioner for Patents
 P.O. Box 1450
 Alexandria VA 22313-1450

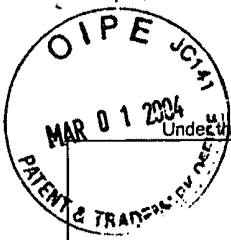
A copy of this notice MUST be returned with the reply.



Customer Service Center

Initial Patent Examination Division (703) 308-1202

PART 3 - OFFICE COPY



PTO/SB/21 (02-04)

Approved for use through 07/31/2006. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

**TRANSMITTAL
FORM**

(to be used for all correspondence after initial filing)

| | | | |
|--|----|------------------------|--------------|
| | | Application Number | 10/675,566 |
| | | Filing Date | 09/30/2003 |
| | | First Named Inventor | Gordon Y. Li |
| | | Art Unit | 2833 |
| | | Examiner Name | TBA |
| Total Number of Pages in This Submission | 14 | Attorney Docket Number | 109822-95 |

ENCLOSURES (Check all that apply)

| | | |
|---|--|--|
| <input checked="" type="checkbox"/> Fee Transmittal Form <input checked="" type="checkbox"/> Fee Attached <input type="checkbox"/> Amendment/Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement <input type="checkbox"/> Certified Copy of Priority Document(s) <input checked="" type="checkbox"/> Response to Missing Parts/Incomplete Application <input checked="" type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53 | <input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s) | <input type="checkbox"/> After Allowance communication to Group <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input type="checkbox"/> Appeal Communication to Group (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input checked="" type="checkbox"/> Other Enclosure(s) (please Identify below): Power of Attorney, Assignment with Recordation Cover Sheet and check return receipt postcards |
| Remarks Enclosures: | | |

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

| | |
|-------------------------|------------------------------------|
| Firm Or Individual name | Troy M. Schmelzer, Reg. No. 36,667 |
| Signature | <i>[Handwritten Signature]</i> |
| Date | 2/27/04 |

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below.

| | | | |
|-----------------------|---------------------|------|---------|
| Typed or printed name | Shari Herron | | |
| Signature | <i>Shari Herron</i> | Date | 2/27/04 |

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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www.USCourtForms.com

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FREE TRANSMITTAL
for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27**TOTAL AMOUNT OF PAYMENT**

(\$) 940.00

Complete if Known

| | |
|----------------------|--------------|
| Application Number | 10/675,566 |
| Filing Date | 09/30/2003 |
| First Named Inventor | Gordon Y. Li |
| Examiner Name | TBA |
| Art Unit | 2833 |
| Attorney Docket No. | 109822-95 |

METHOD OF PAYMENT (check all that apply)
☒ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None
☐ Deposit Account:
 Deposit
Account
Number
Deposit
Account
Name

Procopio Cory Hargreaves & Savitch

50-2075

The Director is authorized to: (check all that apply)

☐ Charge fee(s) indicated below ☒ Credit any overpayments☒ Charge any additional fee(s) or any underpayment of fee(s)☐ Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.**FEE CALCULATION****1. BASIC FILING FEE**

Large Entity Small Entity

| Fee Code | Fee (\$) | Fee Code | Fee (\$) | Fee Description | Fee Paid |
|--------------------|----------|----------|----------|------------------------|--------------------|
| 1001 | 770 | 2001 | 385 | Utility filing fee | 770.00 |
| 1002 | 340 | 2002 | 170 | Design filing fee | |
| 1003 | 530 | 2003 | 265 | Plant filing fee | |
| 1004 | 770 | 2004 | 385 | Reissue filing fee | |
| 1005 | 160 | 2005 | 80 | Provisional filing fee | |
| SUBTOTAL(1) | | | | | (\$) 770.00 |

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

| Total Claims | Extra Claims | Fee from below | Fee Paid |
|--------------------|--------------|----------------|----------|
| Independent Claims | -20** = | X | = |
| Multiple Dependent | -3** = | X | = |

| Large Entity | Small Entity | Fee Description |
|--------------|--------------|--|
| 1202 18 | 2202 9 | Claims in excess of 20 |
| 1201 86 | 2201 43 | Independent claims in excess of 3 |
| 1203 290 | 2203 145 | Multiple dependent claim, if not paid |
| 1204 86 | 2204 43 | ** Reissue independent claims over original patent |
| 1205 18 | 2205 9 | ** Reissue claims in excess of 20 and over original patent |

SUBTOTAL (2)

(\$)

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)**3. ADDITIONAL FEES**

Large Entity Small Entity

| Fee Code | Fee (\$) | Fee Code | Fee (\$) | Fee Description | Fee Paid |
|---------------------|----------|----------|----------|--|----------|
| 1051 | 130 | 2051 | 65 | Surcharge - late filing fee or oath | 130.00 |
| 1052 | 50 | 2052 | 25 | Surcharge - late provisional filing fee or cover sheet | |
| 1053 | 130 | 1053 | 130 | Non-English specification | |
| 1812 | 2,520 | 1812 | 2,520 | For filing a request for <i>ex parte</i> reexamination | |
| 1804 | 920* | 1804 | 920* | Requesting publication of SIR prior to Examiner action | |
| 1805 | 1,840* | 1805 | 1,840* | Requesting publication of SIR after Examiner action | |
| 1251 | 110 | 2251 | 55 | Extension for reply within first month | |
| 1252 | 420 | 2252 | 210 | Extension for reply within second month | |
| 1253 | 950 | 2253 | 475 | Extension for reply within third month | |
| 1254 | 1,480 | 2254 | 740 | Extension for reply within fourth month | |
| 1255 | 2,010 | 2255 | 1,005 | Extension for reply within fifth month | |
| 1401 | 330 | 2401 | 165 | Notice of Appeal | |
| 1402 | 330 | 2402 | 165 | Filing a brief in support of an appeal | |
| 1403 | 290 | 2403 | 145 | Request for oral hearing | |
| 1451 | 1,510 | 1451 | 1,510 | Petition to institute a public use proceeding | |
| 1452 | 110 | 2452 | 55 | Petition to revive - unavoidable | |
| 1453 | 1,330 | 2453 | 665 | Petition to revive - unintentional | |
| 1501 | 1,330 | 2501 | 665 | Utility issue fee (or reissue) | |
| 1502 | 480 | 2502 | 240 | Design issue fee | |
| 1503 | 640 | 2503 | 320 | Plant issue fee | |
| 1460 | 130 | 1460 | 130 | Petitions to the Commissioner | |
| 1807 | 50 | 1807 | 50 | Processing fee under 37 CFR 1.17(q) | |
| 1806 | 180 | 1806 | 180 | Submission of Information Disclosure Stmt | |
| 8021 | 40 | 8021 | 40 | Recording each patent assignment per property (times number of properties) | 40.00 |
| 1809 | 770 | | | | |
| | | 2809 | 385 | Filing a submission after final rejection (37 CFR 1.129(a)) | |
| 1810 | 770 | 2810 | 385 | For each additional invention to be examined (37 CFR 1.129(b)) | |
| 1801 | 770 | 2801 | 385 | Request for Continued Examination (RCE) | |
| 1802 | 900 | 900 | 900 | Request for expedited examination of a design application | |
| Other fee (specify) | | | | | |

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3)

(\$)

940.00

SUBMITTED BY

Name (Print/Type)

Troy M. Schmelzer

Registration No.
(Attorney/Agent)

36,667

(Complete if applicable)

Telephone 619-238-1900

Signature

Date

2/27/04

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This collection of information is required by 37 CFR 1.17 and 1.27. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
 United States Patent and Trademark Office
 Address: COMMISSIONER FOR PATENTS
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 www.uspto.gov

| APPLICATION NUMBER | FILING OR 371 (c) DATE | FIRST NAMED APPLICANT | ATTORNEY DOCKET NUMBER |
|--------------------|------------------------|-----------------------|------------------------|
| 10/675,566 | 09/30/2003 | Gordon G. Li | |

27189
 PROCOPIO, CORY, HARGREAVES & SAVITCH LLP
 530 B STREET
 SUITE 2100
 SAN DIEGO, CA 92101

CONFIRMATION NO. 9980

FORMALITIES LETTER



OC000000011576390

Date Mailed: 12/29/2003



NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

*Filing Date Granted***Items Required To Avoid Abandonment:**

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
Applicant must submit \$ 770 to complete the basic filing fee for a non-small entity. If appropriate, applicant may make a written assertion of entitlement to small entity status and pay the small entity filing fee (37 CFR 1.27).
- The oath or declaration is missing.
A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(e) of \$130 for a non-small entity, must be submitted with the missing items identified in this letter.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is **\$900** for a Large Entity

- **\$770** Statutory basic filing fee.
- **\$130** Late oath or declaration Surcharge.

Replies should be mailed to: Mail Stop Missing Parts
 Commissioner for Patents
 P.O. Box 1450
 Alexandria VA 22313-1450

03/04/2004 NIBERHE 00000066 10675566

01 FC:1001 770.00 OP
 02 FC:1051 130.00 OP

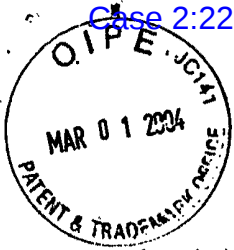
A copy of this notice MUST be returned with the reply.



Customer Service Center

Initial Patent Examination Division (703) 308-1202

PART 2 - COPY TO BE RETURNED WITH RESPONSE



PATENT
PCHS Ref. 109822-95
02CXT0070D

DECLARATION FOR UTILITY PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled:

ARCHITECTURE FOR A FLEXIBLE AND HIGH-PERFORMANCE GATEWAY CABLE MODEM

the specification of which

☐ is attached hereto

OR

☒ was filed on September 30, 2003 as United States Application Serial No. 10/675,566 or PCT International Application No. _____ and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56.

I hereby claim foreign priority benefits under 35 USC 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed:

| Prior Foreign Application Number(s) | Country | Date of Filing | Priority Claimed | |
|--|---------|----------------|------------------|----|
| | | | Yes | No |
| | | | | |

I hereby claim the benefit under 35 USC 119(e) of any United States provisional application(s) listed below:

| Application Number(s) | Filing Date |
|-----------------------|-------------|
| | |

I hereby claim the benefit under 35 USC 120 of any United States application(s), or 365(c) of any PCT international application designating the United States, listed below and, insofar as the subject matter of any claim of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of 35 USC 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

| U.S. Parent Application Number | PCT Parent Number | Parent Filing Date | Status-Patented, Pending or Abandoned |
|-----------------------------------|-------------------|--------------------|---|
| | | | |

PATENT
 PCHS Matter No. 109822-95
 02CXT0070D

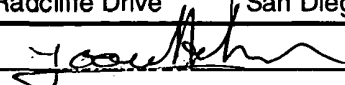
Please direct all correspondence to Troy Schmelzer at Customer Number 27189:

PROCOPIO, CORY, HARGREAVES & SAVITCH, LLP
 530 B Street, Suite 2100
 San Diego, CA 921010-4469
 Tel: 619-238-1900
 Fax: 619-235-0398

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 USC 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

| | | | | |
|---------------------------------------|-----------------------------|--|----------------------------------|-------------------|
| FULL NAME OF INVENTOR | FIRST Name Gordon | MIDDLE Initial Y. | LAST Name Li | |
| RESIDENCE & CITIZENSHIP | City San Diego | State or Foreign Country California | Country of Citizenship Canada | |
| POST OFFICE ADDRESS | Street 12346 Pathos Lane | City San Dieog | State or Country California | Zip Code 92129 |
| INVENTOR'S SIGNATURE <u>Gordon Li</u> | | | DATE <u>Nov. 12, '03</u> | |

PATENT
PCHS Matter No. 109822-95
02CXT0070D

| | | | | |
|--|--------------------------------|--|---|-------------------|
| FULL NAME OF INVENTOR | FIRST Name Yoav | MIDDLE Initial | LAST Name Hebron | |
| RESIDENCE & CITIZENSHIP | City San Diego | State or Foreign Country California | Country of Citizenship United States | |
| POST OFFICE ADDRESS | Street 6215 Radcliffe Drive | City San Diego | State or Country California | Zip Code 92122 |
| INVENTOR'S SIGNATURE  | | | DATE <u>11/12/03</u> | |



PATENT
PCHS Matter No. 109822-95
02CXT0070D

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: :
:
Gordon G. Li and Yoav Hebron :
:
Serial No. 10/675,566 :
:
Filed: September 30, 2003 :
:
For: Architecture for a Flexible and :
:
High-performance Gateway Cable Modem :

POWER OF ATTORNEY

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Conexant Systems, Inc., assignee of the captioned patent application, hereby appoints as its attorneys and/or agents, with full power of substitution and revocation, to prosecute this application and transact all business in the United States Patent and Trademark Office and in countries other than the United States, and to do all things necessary or appropriate therefor before any competent international authorities in connection with any international patent applications corresponding to the captioned application, Sam Talpalatsky, Reg. No. 35,380, Joseph H. Lee, Reg. No. 37,664, and all of the registered practitioners identified by Customer Number 27189.

Please direct all correspondence to Troy M. Schmelzer at Customer No. 27189:



27189

PATENT TRADEMARK OFFICE

PROCOPIO, CORY, HARGREAVES & SAVITCH LLP
530 B Street, Suite 2100
San Diego, CA 92101-4469
Tel: (619) 238-1900
Fax: (619) 235-0398

The undersigned is authorized to sign this document on behalf of Conexant Systems, Inc.

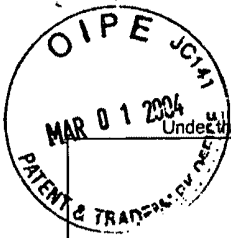
Respectfully submitted,

Conexant Systems, Inc.

Dated: 12.4.03

By:


Sam Talpalatsky



PTO/SB/21 (02-04)

Approved for use through 07/31/2006. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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**TRANSMITTAL
FORM**

(to be used for all correspondence after initial filing)

| | | | |
|--|----|------------------------|--------------|
| | | Application Number | 10/675,566 |
| | | Filing Date | 09/30/2003 |
| | | First Named Inventor | Gordon Y. Li |
| | | Art Unit | 2833 |
| | | Examiner Name | TBA |
| Total Number of Pages in This Submission | 14 | Attorney Docket Number | 109822-95 |

ENCLOSURES (Check all that apply)

| | | |
|---|--|--|
| <input checked="" type="checkbox"/> Fee Transmittal Form <input checked="" type="checkbox"/> Fee Attached <input type="checkbox"/> Amendment/Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement <input type="checkbox"/> Certified Copy of Priority Document(s) <input checked="" type="checkbox"/> Response to Missing Parts/Incomplete Application <input checked="" type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53 | <input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s) | <input type="checkbox"/> After Allowance communication to Group <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input type="checkbox"/> Appeal Communication to Group (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input checked="" type="checkbox"/> Other Enclosure(s) (please Identify below): Power of Attorney, Assignment with Recordation Cover Sheet and check return receipt postcards |
| Remarks Enclosures: | | |

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

| | |
|-------------------------|------------------------------------|
| Firm Or Individual name | Troy M. Schmelzer, Reg. No. 36,667 |
| Signature | <i>[Handwritten Signature]</i> |
| Date | 2/27/04 |

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below.

| | | | |
|-----------------------|---------------------|------|---------|
| Typed or printed name | Shari Herron | | |
| Signature | <i>Shari Herron</i> | Date | 2/27/04 |

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27**TOTAL AMOUNT OF PAYMENT**(\$)**940.00****Complete if Known**

| | |
|----------------------|--------------|
| Application Number | 10/675,566 |
| Filing Date | 09/30/2003 |
| First Named Inventor | Gordon Y. Li |
| Examiner Name | TBA |
| Art Unit | 2833 |
| Attorney Docket No. | 109822-95 |

METHOD OF PAYMENT (check all that apply)
☒ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None
☐ Deposit Account:
 Deposit
Account
Number
Deposit
Account
Name

Procopio Cory Hargreaves & Savitch

50-2075

The Director is authorized to: (check all that apply)

☐ Charge fee(s) indicated below ☒ Credit any overpayments☒ Charge any additional fee(s) or any underpayment of fee(s)☐ Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.**FEE CALCULATION****1. BASIC FILING FEE**

Large Entity Small Entity

| Fee Code | Fee (\$) | Fee Code | Fee (\$) | Fee Description | Fee Paid |
|--------------------|----------|----------|----------|------------------------|--------------------|
| 1001 | 770 | 2001 | 385 | Utility filing fee | 770.00 |
| 1002 | 340 | 2002 | 170 | Design filing fee | |
| 1003 | 530 | 2003 | 265 | Plant filing fee | |
| 1004 | 770 | 2004 | 385 | Reissue filing fee | |
| 1005 | 160 | 2005 | 80 | Provisional filing fee | |
| SUBTOTAL(1) | | | | | (\$) 770.00 |

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

| Total Claims | Extra Claims | Fee from below | Fee Paid |
|--------------------|--------------|----------------|----------|
| Independent Claims | -20** = | X | = |
| Multiple Dependent | -3** = | X | = |

| Large Entity | Small Entity | Fee Description |
|--------------|--------------|--|
| 1202 18 | 2202 9 | Claims in excess of 20 |
| 1201 86 | 2201 43 | Independent claims in excess of 3 |
| 1203 290 | 2203 145 | Multiple dependent claim, if not paid |
| 1204 86 | 2204 43 | ** Reissue independent claims over original patent |
| 1205 18 | 2205 9 | ** Reissue claims in excess of 20 and over original patent |

SUBTOTAL (2)

(\$)

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)**3. ADDITIONAL FEES**

Large Entity Small Entity

| Fee Code | Fee (\$) | Fee Code | Fee (\$) | Fee Description | Fee Paid |
|---------------------|----------|----------|----------|--|----------|
| 1051 | 130 | 2051 | 65 | Surcharge - late filing fee or oath | 130.00 |
| 1052 | 50 | 2052 | 25 | Surcharge - late provisional filing fee or cover sheet | |
| 1053 | 130 | 1053 | 130 | Non-English specification | |
| 1812 | 2,520 | 1812 | 2,520 | For filing a request for <i>ex parte</i> reexamination | |
| 1804 | 920* | 1804 | 920* | Requesting publication of SIR prior to Examiner action | |
| 1805 | 1,840* | 1805 | 1,840* | Requesting publication of SIR after Examiner action | |
| 1251 | 110 | 2251 | 55 | Extension for reply within first month | |
| 1252 | 420 | 2252 | 210 | Extension for reply within second month | |
| 1253 | 950 | 2253 | 475 | Extension for reply within third month | |
| 1254 | 1,480 | 2254 | 740 | Extension for reply within fourth month | |
| 1255 | 2,010 | 2255 | 1,005 | Extension for reply within fifth month | |
| 1401 | 330 | 2401 | 165 | Notice of Appeal | |
| 1402 | 330 | 2402 | 165 | Filing a brief in support of an appeal | |
| 1403 | 290 | 2403 | 145 | Request for oral hearing | |
| 1451 | 1,510 | 1451 | 1,510 | Petition to institute a public use proceeding | |
| 1452 | 110 | 2452 | 55 | Petition to revive - unavoidable | |
| 1453 | 1,330 | 2453 | 665 | Petition to revive - unintentional | |
| 1501 | 1,330 | 2501 | 665 | Utility issue fee (or reissue) | |
| 1502 | 480 | 2502 | 240 | Design issue fee | |
| 1503 | 640 | 2503 | 320 | Plant issue fee | |
| 1460 | 130 | 1460 | 130 | Petitions to the Commissioner | |
| 1807 | 50 | 1807 | 50 | Processing fee under 37 CFR 1.17(q) | |
| 1806 | 180 | 1806 | 180 | Submission of Information Disclosure Stmt | |
| 8021 | 40 | 8021 | 40 | Recording each patent assignment per property (times number of properties) | 40.00 |
| 1809 | 770 | | | | |
| | | 2809 | 385 | Filing a submission after final rejection (37 CFR 1.129(a)) | |
| 1810 | 770 | 2810 | 385 | For each additional invention to be examined (37 CFR 1.129(b)) | |
| 1801 | 770 | 2801 | 385 | Request for Continued Examination (RCE) | |
| 1802 | 900 | 900 | 900 | Request for expedited examination of a design application | |
| Other fee (specify) | | | | | |

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3)

(\$)

940.00**SUBMITTED BY**

Name (Print/Type)

Troy M. Schmelzer

Registration No.
(Attorney/Agent)

36,667

(Complete if applicable)

Telephone 619-238-1900

Signature

Date

2/27/04

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| APPLICATION NUMBER | FILING OR 371 (c) DATE | FIRST NAMED APPLICANT | ATTORNEY DOCKET NUMBER |
|--------------------|------------------------|-----------------------|------------------------|
| 10/675,566 | 09/30/2003 | Gordon G. Li | |

27189
 PROCOPIO, CORY, HARGREAVES & SAVITCH LLP
 530 B STREET
 SUITE 2100
 SAN DIEGO, CA 92101

CONFIRMATION NO. 9980

FORMALITIES LETTER



OC000000011576390

Date Mailed: 12/29/2003



NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

*Filing Date Granted***Items Required To Avoid Abandonment:**

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- The statutory basic filing fee is missing.
Applicant must submit \$ 770 to complete the basic filing fee for a non-small entity. If appropriate, applicant may make a written assertion of entitlement to small entity status and pay the small entity filing fee (37 CFR 1.27).
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SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is **\$900** for a Large Entity

- **\$770** Statutory basic filing fee.
- **\$130** Late oath or declaration Surcharge.

Replies should be mailed to: Mail Stop Missing Parts
 Commissioner for Patents
 P.O. Box 1450
 Alexandria VA 22313-1450

03/04/2004 HIBERHE 00000066 10675566

01 FC:1001 770.00 OP
 02 FC:1051 130.00 OP

A copy of this notice MUST be returned with the reply.

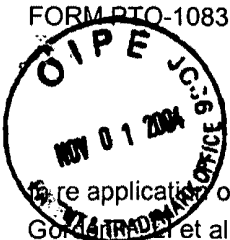


Customer Service Center

Initial Patent Examination Division (703) 308-1202

PART 2 - COPY TO BE RETURNED WITH RESPONSE

FORM PTO-1083

PATENT
88537.0065

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

is re application of:
Gordon et al.

Serial No: 10/675,566

Confirmation No.: 9980

Filed: September 30, 2003

For: ARCHITECTURE FOR A FLEXIBLE AND HIGH-
PERFORMANCE GATEWAY CABLE MODEM

Art Unit: 2833

Examiner: Not Assigned

I hereby certify that this correspondence is
being deposited with the United States Postal
Service with sufficient postage as first class
mail in an envelope addressed to:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450, on
October 26, 2004

Date of Deposit
Joyce Hegeman

Signature _____ Date October 26, 2004

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Transmitted in the above-identified application is the following:

- ☒ Power of Attorney By Assignee of Entire Interest and
Change of Correspondence Address
- ☒ Return postcard
- ☒ The Commissioner is hereby authorized to charge any deficiencies of fees associated with this
communication or credit any overpayment to Deposit Account No. 50-1314. **A copy of this sheet is
enclosed.**
- ☒ Any filing fees under 37 C.F.R. § 1.16 for the presentation of extra claims
- ☒ Any patent application processing fees under 37 C.F.R. § 1.17

Respectfully submitted,
HOGAN & HARTSON L.L.P.

Date: October 26, 2004

Biltmore Tower
500 South Grand Avenue, Suite 1900
Los Angeles, California
90071

Telephone: 213 337-6700

Facsimile: 213 337-6701

By: _____

Troy M. Schmelzer
Registration No. 36,667
Attorney for Applicant(s)



PATENT
88357.0002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Matters of:

Assignee: Conexant Systems, Inc.

Please see Schedule A (attached)

**POWER OF ATTORNEY BY ASSIGNEE OF ENTIRE
INTEREST AND CHANGE OF CORRESPONDENCE
ADDRESS**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I hereby certify that this correspondence
is being deposited with the United States
Postal Service with sufficient postage as
first class mail in an envelope addressed
to:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450, on

7-14-04
Date of Deposit

Joyce Hegeman

Name

Signature

7-14-04
Date

Conexant Systems, Inc., assignee of the patent applications listed on the attached Schedule A, revokes all previous powers of attorney or authorizations of agent and appoints as its attorneys and/or agents, with full power of substitution and revocation, to prosecute these applications and transact all business in the United States Patent and Trademark Office, and in countries other than the United States, and to do all things necessary or appropriate therefore before any competent international authorities in connection with any international patent applications and patents corresponding to these applications:

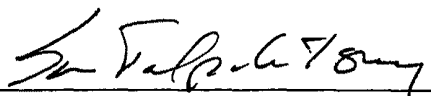
Troy M. Schmelzer, Reg. No. 36,667; Stuart Lubitz, Reg. No. 20,680; Anthony J. Orler, Reg. No. 41,232; Lawrence J. McClure, Reg. No. 44,228; Barry Shuman, Reg. No. 50,220; Jeffrey Hopkins, Reg. No. 53,034; Yanan Luo, Reg. No. 54,284; Olga Berson, Reg. No. 55,001; Sam Talpalatsky, Reg. No. 35,380; and Joseph H. Lee, Reg. No. 37,664.

Please direct all correspondence in the applications listed in the attached Schedule A to:

Troy M. Schmelzer
HOGAN & HARTSON L.L.P.
500 South Grand Avenue, Suite 1900
Los Angeles, California 90071
Phone: 213-337-6700
Fax: 213-337-670

Date:

7-9-04


Sam Talpalatsky
IP Counsel
Conexant Systems, Inc.
4000 MacArthur Road
Department 927, K10-171
Newport Beach, CA 92660

SCHEDULE A

| | |
|----|---------------------------------|
| 1 | U.S. Application No. 09/239,501 |
| 2 | U.S. Application No. 09/828,568 |
| 3 | U.S. Application No. 09/634,265 |
| 4 | U.S. Application No. 09/588,992 |
| 5 | U.S. Application No. 10/786,921 |
| 6 | U.S. Application No. 10/210,591 |
| 7 | U.S. Application No. 10/214,960 |
| 8 | U.S. Application No. 10/245,982 |
| 9 | U.S. Application No. 10/000,878 |
| 10 | U.S. Application No. 09/865,300 |
| 11 | U.S. Application No. 09/428,953 |
| 12 | U.S. Application No. 09/537,967 |
| 13 | U.S. Application No. 10/325,618 |
| 14 | U.S. Application No. 10/353,538 |
| 15 | U.S. Application No. 10/376,824 |
| 16 | U.S. Application No. 09/989,100 |
| 17 | U.S. Application No. 09/547,424 |
| 18 | U.S. Application No. 10/637,324 |
| 19 | U.S. Application No. 10/675,566 |
| 20 | U.S. Application No. 10/677,110 |
| 21 | U.S. Application No. 10/676,900 |
| 22 | U.S. Application No. 10/749,571 |
| 23 | U.S. Application No. 10/749,570 |



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| APPLICATION NUMBER | FILING OR 371 (c) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|--------------------|------------------------|-----------------------|------------------------|
| 10/675,566 | 09/30/2003 | Gordon Y. Li | 109822-95 |

TROY M SCHMELZER
 HOGAN & HARTSON
 500 SOUTH GRAND AVENUE
 SUITE 1900
 LOS ANGELES, CA 90071

CONFIRMATION NO. 9980

OC000000014379272

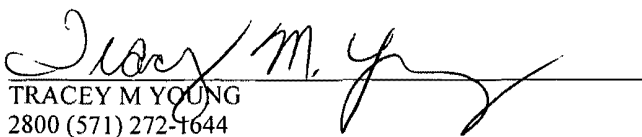
OC000000014379272

Date Mailed: 11/16/2004

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 11/01/2004.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.


 TRACEY M YOUNG
 2800 (571) 272-1644

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| APPLICATION NUMBER | FILING OR 371 (c) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|--------------------|------------------------|-----------------------|------------------------|
| 10/675,566 | 09/30/2003 | Gordon Y. Li | 109822-95 |

27189
 PROCOPIO, CORY, HARGREAVES & SAVITCH LLP
 530 B STREET
 SUITE 2100
 SAN DIEGO, CA 92101

CONFIRMATION NO. 9980

OC000000014379227

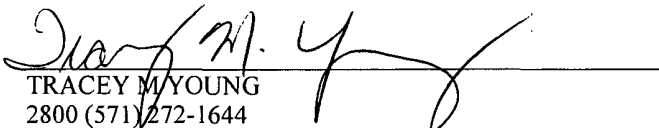
OC000000014379227

Date Mailed: 11/16/2004

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 11/01/2004.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).


 TRACEY M. YOUNG
 2800 (571) 272-1644

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PLUS Search Results for S/N 10675566, Searched Mon Jul 30 12:49:22 EDT 2007

The Patent Linguistics Utility System (PLUS) is a USPTO automated search system for U.S. Patents from 1971 to the present PLUS is a query-by-example search system which produces a list of patents that are most closely related linguistically to the application searched. This search was prepared by the staff of the Scientific and Technical Information Center, SIRA.

20050071492 76
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7164690 54
20010030975 54
6629288 52
20020073431 52
20020196796 50

PLUS Search Results for S/N 10675566, Searched Mon Jul 30 12:49:37 EDT 2007

The Patent Linguistics Utility System (PLUS) is a USPTO automated search system for U.S. Patents from 1971 to the present PLUS is a query-by-example search system which produces a list of patents that are most closely related linguistically to the application searched. This search was prepared by the staff of the Scientific and Technical Information Center, SIRA.

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PTO/SB/81 (07-08)

Approved for use through 12/31/2008. OMB 0651-0035

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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| | | |
|---|-------------------------------|--|
| POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS | Application Number | 10675566 |
| | Filing Date | Sep 30, 2003 |
| | First Named Inventor | Gordon Li |
| | Title | Architecture for a flexible and high-performance gateway cable modem |
| | Art Unit | 2153 |
| | Examiner Name | LIM, KRISNA |
| | Attorney Docket Number | 109822-95 |

I hereby revoke all previous powers of attorney given in the above-identified application.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

65913

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

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☒ The address associated with the above-mentioned Customer Number.

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name

Address

City

State

Zip

Country

Telephone

Email

I am the:

☐ Applicant/Inventor.

OR

☒ Assignee of record of the entire interest. See 37 CFR 3.71.

Statement under 37 CFR 3.73(b) (Form PTO/SB/96) submitted herewith or filed on _____.

SIGNATURE of Applicant or Assignee of Record

| | | | |
|-------------------|--------------------------------------|-----------|----------------|
| Signature | /Peter Zawilski/ | Date | Sep 17, 2008 |
| Name | Peter S. Zawilski, Reg. No. 43,305 | Telephone | (408) 474-9063 |
| Title and Company | Authorized Representative, NXP, B.V. | | |

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☒ *Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

ENTROPIC_CHARTER_0005488

STATEMENT UNDER 37 CFR 3.73(b)Applicant/Patent Owner: NXP, B.V.Application No./Patent No.: 10675566 Filed/Issue Date: Sep 30, 2003Entitled: Architecture for a flexible and high-performance gateway cable modemNXP, B.V., a corporation

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ the assignee of the entire right, title, and interest; or
2. ☐ an assignee of less than the entire right, title and interest
(The extent (by percentage) of its ownership interest is _____ %)

in the patent application/patent identified above by virtue of either:

A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 021531, Frame 0523, or for which a copy thereof is attached.

OR

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.
2. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.
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☐ Additional documents in the chain of title are listed on a supplemental sheet.

☐ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Peter Zawilski/Sep 17, 2008

Signature

Date

Peter S. Zawilski, Reg. No. 43,305(408) 474-9063

Printed or Typed Name

Telephone Number

Authorized Representative

Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer,

U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Acknowledgement Receipt

| | |
|---|--|
| EFS ID: | 3961639 |
| Application Number: | 10675566 |
| International Application Number: | |
| Confirmation Number: | 9980 |
| Title of Invention: | Architecture for a flexible and high-performance gateway cable modem |
| First Named Inventor/Applicant Name: | Gordon Y. Li |
| Customer Number: | 26021 |
| Filer: | Peter Zawilski |
| Filer Authorized By: | |
| Attorney Docket Number: | 109822-95 |
| Receipt Date: | 17-SEP-2008 |
| Filing Date: | 30-SEP-2003 |
| Time Stamp: | 20:25:02 |
| Application Type: | Utility under 35 USC 111(a) |

Payment information:

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|------------------------|----|
| Submitted with Payment | no |
|------------------------|----|

File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|-----------------|----------------------|---|---|------------------|------------------|
| 1 | Power of Attorney | 10675566_SB-81_96_XML-Combo_2008-SEP-17.pdf | 42541 6a4d7fcfd44fc5f10c019a4266ad6ac241f761e2 | no | 2 |

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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



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| APPLICATION NUMBER | FILING OR 371(C) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|--------------------|-----------------------|-----------------------|------------------------|
| 10/675,566 | 09/30/2003 | Gordon Y. Li | 109822-95 |

CONFIRMATION NO. 9980**POA ACCEPTANCE LETTER**

65913
 NXP, B.V.
 NXP INTELLECTUAL PROPERTY DEPARTMENT
 M/S41-SJ
 1109 MCKAY DRIVE
 SAN JOSE, CA 95131

Date Mailed: 09/26/2008

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 09/17/2008.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/sleutchit/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



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|--------------------|-----------------------|-----------------------|------------------------|
| 10/675,566 | 09/30/2003 | Gordon Y. Li | 109822-95 |

CONFIRMATION NO. 9980

POWER OF ATTORNEY NOTICE



26021
 HOGAN & HARTSON L.L.P.
 1999 AVENUE OF THE STARS
 SUITE 1400
 LOS ANGELES, CA 90067

Date Mailed: 09/26/2008

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 09/17/2008.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/sleutchit/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

To: ip.department.us@nxp.com,,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 65913

Sep 26, 2008 05:52:38 AM

Dear PAIR Customer:

NXP, B.V.
NXP INTELLECTUAL PROPERTY DEPARTMENT
M/S41-SJ
1109 MCKAY DRIVE
SAN JOSE, CA 95131
UNITED STATES

The following USPTO patent application(s) associated with your Customer Number, 65913 , have new outgoing correspondence. This correspondence is now available for viewing in Private PAIR.

The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

Disclaimer:

The list of documents shown below is provided as a courtesy and is not part of the official file wrapper. The content of the images shown in PAIR is the official record.

| Application | Document | Mailroom Date | Attorney Docket No. |
|-------------|----------|---------------|---------------------|
| 10675566 | N570 | 09/26/2008 | 109822-95 |
| | N570 | 09/26/2008 | 109822-95 |

To view your correspondence online or update your email addresses, please visit us anytime at <https://sportal.uspto.gov/secure/myportal/privatepair>.

If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov with 'e-Office Action' on the subject line or call 1-866-217-9197 during the following hours:

Monday - Friday 6:00 a.m. to 12:00 a.m.

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| | | | | |
|--|--------------------|----------------------|---------------------------------|-----------------------------|
| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
| 10/675,566 | 09/30/2003 | Gordon Y. Li | 81373818US01-02CXT0070D | 9980 |
| 65913 NXP, B.V. NXP INTELLECTUAL PROPERTY DEPARTMENT M/S41-SJ 1109 MCKAY DRIVE SAN JOSE, CA 95131 | 7590 02/19/2009 | | EXAMINER HOSSAIN, TANIM M | |
| | | | ART UNIT 2445 | PAPER NUMBER |
| | | | NOTIFICATION DATE 02/19/2009 | DELIVERY MODE ELECTRONIC |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip.department.us@nxp.com

| | | | | | |
|------------------------------|------------------------|--|---------------------|--|--|
| Office Action Summary | Application No. | | Applicant(s) | | |
| | 10/675,566 | | LI ET AL. | | |
| | Examiner | | Art Unit | | |
| | Tanim Hossain | | 2445 | | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on 30 September 2003.

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 1-15 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 1-15 is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on 30 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some * c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

Application/Control Number: 10/675,566
Art Unit: 2445

Page 2

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Brooks (U.S. 2001/0039600)

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention “by another,” or by an appropriate showing under 37 CFR 1.131.

As per claim 1, Brooks teaches a cable modem system comprising: a data networking engine that performs data networking functions (Abstract; paragraphs 0013-0016); and a cable modem engine that performs all other cable modem functions (Abstract; paragraphs 0013-0016); the cable modem engine being completely partitioned from the data networking engine (Abstract; paragraphs 0013-0016).

Application/Control Number: 10/675,566
Art Unit: 2445

Page 3

As per claim 2, Brooks teaches a cable modem system as claimed in claim 1, wherein all DOCSIS functions are localized in the cable modem engine (0024-0026).

As per claim 3, Brooks teaches a cable modem system as claimed in claim 2, wherein VoIP functionality is embedded in the cable modem engine (0024-0026).

As per claim 4, Brooks teaches a cable modem system as claimed in claim 1, and further comprising an advanced crypto engine that performs all crypto functions (0013).

As per claim 5, Brooks teaches a cable modem system as claimed in claim 1, wherein the cable modem engine comprises: a DOCSIS PHY layer (0024-0026); a DOCSIS MAC processor (0024-0026); and a DOCSIS controller (0024-0026).

As per claim 6, Brooks teaches a cable modem system as claimed in claim 5, wherein the DOCSIS PHY layer comprises a hardware transmitter and receiver (0024-0026).

As per claim 7, Brooks teaches a cable modem system as claimed in claim 5, wherein the DOCSIS MAC processor processes downstream PDU packets and forwards the processed packets directly to the data networking engine without the involvement of the DOCSIS controller in order to boost downstream throughput (0024-0026).

As per claim 8, Brooks teaches a cable modem system as claimed in claim 5, wherein all VoIP functionality is implemented in the DOCSIS controller (0024-0026).

As per claim 9, Brooks teaches a cable modem system as claimed in claim 8, wherein the VoIP functionality is in conformance with the PacketCable specification (0024-0026).

As per claim 10, Brooks teaches a cable modem system as claimed in claim 5, wherein the data networking engine is responsible for all data networking processing including advanced

Application/Control Number: 10/675,566
Art Unit: 2445

Page 4

multi-port bridging/routing with NAT/firewall and VPN, and home networking applications (0024-0026).

As per claim 11, Brooks teaches a cable modem system as claimed in claim 10, wherein the data networking engine comprises the entire embedded portal services functionality of the CableHome specification (0024-0026).

As per claim 12, Brooks teaches a cable modem architecture comprising: a cable modem engine comprising: a DOCSIS PHY layer comprising a transmitter and receiver (0024-0026); a DOCSIS MAC processor that implements real-time critical MAC functions for both upstream and downstream communications (0024-0026); and a DOCSIS controller implementing VoIP functionality (0024-0026); and a data networking engine implementing all data networking processing and home networking applications, wherein the data networking engine is completely decoupled from the cable modem engine (0024-0026).

As per claim 13, Brooks teaches a cable modem architecture as claimed in claim 12, wherein the DOCSIS controller provides VoIP functionality in accordance with the PacketCable specification, and wherein the data networking engine provides the embedded portal services functionality of the CableHome specification, wherein the CableHome functionality is provided by the data networking engine is completely decoupled from the PacketCable and DOCSIS functionality provided by the cable modem engine (0013-0016, 0024-0026).

As per claim 14, Brooks teaches a cable modem architecture as claimed in claim 13, wherein the DOCSIS MAC processor is an ARM9TDMI-based RISC processor, and wherein the DOCSIS controller is an ARM940-based RISC processor (0013-0016, 0024-0026).

Application/Control Number: 10/675,566
Art Unit: 2445

Page 5

As per claim 15, Brooks teaches a method for providing a flexible and partitioned cable modem gateway comprising: providing data and home networking functionality in a data networking engine; providing DOCSIS and VoIP functionality in a cable modem engine (0013-0016, 0024-0026); and partitioning the data networking engine from the cable modem engine so that the data and home networking functionality is completely decoupled from the DOCSIS and VoIP functionality (0013-0016, 0024-0026).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tanim Hossain whose telephone number is (571)272-3881. The examiner can normally be reached on 8:30 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenton Burgess can be reached on 571/272-3949. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Application/Control Number: 10/675,566
Art Unit: 2445

Page 6

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Tanim Hossain
Patent Examiner
Art Unit 2445

/Larry D Donaghue/
Primary Examiner, Art Unit 2454

| | | | | |
|-----------------------------------|---------------------------------------|--|---|-------------|
| Notice of References Cited | Application/Control No. 10/675,566 | | Applicant(s)/Patent Under Reexamination LI ET AL. | |
| | Examiner Tanim Hossain | | Art Unit 2445 | Page 1 of 1 |

U.S. PATENT DOCUMENTS

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Name | Classification |
|---|---|--|-----------------|---------------|----------------|
| * | A | US-2001/0039600 | 11-2001 | Brooks et al. | 710/126 |
| | B | US- | | | |
| | C | US- | | | |
| | D | US- | | | |
| | E | US- | | | |
| | F | US- | | | |
| | G | US- | | | |
| | H | US- | | | |
| | I | US- | | | |
| | J | US- | | | |
| | K | US- | | | |
| | L | US- | | | |
| | M | US- | | | |


FOREIGN PATENT DOCUMENTS

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Country | Name | Classification |
|---|---|--|-----------------|---------|------|----------------|
| | N | | | | | |
| | O | | | | | |
| | P | | | | | |
| | Q | | | | | |
| | R | | | | | |
| | S | | | | | |
| | T | | | | | |

NON-PATENT DOCUMENTS

| * | | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) |
|---|---|---|
| | U | |
| | V | |
| | W | |
| | X | |

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

| | | |
|--|--|---|
| <i>Index of Claims</i>  | Application/Control No. 10675566 | Applicant(s)/Patent Under Reexamination LI ET AL. |
| | Examiner Tanim Hossain | Art Unit 2445 |

| | | | | | | | |
|---|-----------------|---|-------------------|---|---------------------|---|-----------------|
| ✓ | Rejected | - | Cancelled | N | Non-Elected | A | Appeal |
| = | Allowed | ÷ | Restricted | I | Interference | O | Objected |


☐ Claims renumbered in the same order as presented by applicant

☐ CPA

☐ T.D.

☐ R.1.47

| CLAIM | | DATE | | | | | | | | |
|-------|----------|------------|--|--|--|--|--|--|--|--|
| Final | Original | 02/16/2009 | | | | | | | | |
| | 1 | ✓ | | | | | | | | |
| | 2 | ✓ | | | | | | | | |
| | 3 | ✓ | | | | | | | | |
| | 4 | ✓ | | | | | | | | |
| | 5 | ✓ | | | | | | | | |
| | 6 | ✓ | | | | | | | | |
| | 7 | ✓ | | | | | | | | |
| | 8 | ✓ | | | | | | | | |
| | 9 | ✓ | | | | | | | | |
| | 10 | ✓ | | | | | | | | |
| | 11 | ✓ | | | | | | | | |
| | 12 | ✓ | | | | | | | | |
| | 13 | ✓ | | | | | | | | |
| | 14 | ✓ | | | | | | | | |
| | 15 | ✓ | | | | | | | | |

| | | |
|--|--|---|
| Search Notes  | Application/Control No. 10675566 | Applicant(s)/Patent Under Reexamination LI ET AL. |
| | Examiner Tanim Hossain | Art Unit 2445 |

| | | | |
|-----------------|-----------------|-------------|-----------------|
| SEARCHED | | | |
| Class | Subclass | Date | Examiner |
| | | | |

| | | | |
|---------------------|--|-------------|-----------------|
| SEARCH NOTES | | | |
| Search Notes | | Date | Examiner |
| EAST | | 2/16/09 | TH |

| | | | |
|----------------------------|-----------------|-------------|-----------------|
| INTERFERENCE SEARCH | | | |
| Class | Subclass | Date | Examiner |
| | | | |

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EAST Search History

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|-------|-------|--|--------------------|------------------|---------|---------------------|
| S1 | 28271 | cable\$4 near2 modem \$4 | US-PGPUB; USPAT | OR | OFF | 2009/02/16 05:09 |
| S2 | 2625 | (cable\$4 near2 modem \$4) and docsis | US-PGPUB; USPAT | OR | OFF | 2009/02/16 05:09 |
| S3 | 482 | (cable\$4 near2 modem \$4).ab. and docsis | US-PGPUB; USPAT | OR | OFF | 2009/02/16 05:10 |
| S4 | 91 | (cable\$4 near2 modem \$4).ab. and docsis and ((integrat\$4 with (function \$4 or service \$4) same modem\$4)) | US-PGPUB; USPAT | OR | OFF | 2009/02/16 05:12 |
| S5 | 21 | (cable\$4 near2 modem \$4).ab. and docsis and ((integrat\$4 with (function \$4 or service \$4) same modem\$4)) and partition \$4 | US-PGPUB; USPAT | OR | OFF | 2009/02/16 05:12 |

| | | | | | | |
|----|-----|--|--------------------|----|-----|---------------------|
| S6 | 13 | (cable\$4 near2 modem \$4).ab. and docsis and ((integrat\$4 with (function \$4 or service \$4) same modem\$4)) and partition \$4 and voip \$4 | US-PGPUB; USPAT | OR | OFF | 2009/02/16 05:12 |
| S7 | 230 | (cable\$4 near2 modem \$4).ab. and docsis and ((integrat\$4 or multipl\$4 or pluralit\$4) with (function \$4 or service \$4) same modem\$4) | US-PGPUB; USPAT | OR | OFF | 2009/02/16 05:25 |
| S8 | 35 | (cable\$4 near2 modem \$4).ti. and docsis and ((integrat\$4 with (function \$4 or service \$4) same modem\$4)) | US-PGPUB; USPAT | OR | OFF | 2009/02/16 05:26 |
| S9 | 94 | (cable\$4 near2 modem \$4).ti. and docsis and ((integrat\$4 or multipl\$4 or pluralit\$4) with (function \$4 or service \$4) same modem\$4) | US-PGPUB; USPAT | OR | OFF | 2009/02/16 05:27 |

2/16/09 12:08:56 PM

C:\Documents and Settings\thossain\My Documents\EAST\Workspaces

\ 10675566 Li - Multiple Function Cable Modem.wsp

To: ip.department.us@nxp.com,,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 65913

Feb 19, 2009 05:49:24 AM

Dear PAIR Customer:

NXP, B.V.
NXP INTELLECTUAL PROPERTY DEPARTMENT
M/S41-SJ
1109 MCKAY DRIVE
SAN JOSE, CA 95131
UNITED STATES

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The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

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| Application | Document | Mailroom Date | Attorney Docket No. |
|-------------|----------|---------------|-------------------------|
| 10675566 | CTNF | 02/19/2009 | 81373818US01-02CXT0070D |
| | 892 | 02/19/2009 | 81373818US01-02CXT0070D |

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PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

Confirmation No. 9980

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

| | | | |
|-------------|---|-----------------|------------------------------|
| Applicant: | LI <i>et al.</i> | Examiner: | Hossain, Tanim |
| Serial No.: | 10/675,566 | Group Art Unit: | 2445 |
| Filed: | September 30, 2003 | Docket No.: | 81373818US01 (NXPS.615PA) |
| Title: | ARCHITECTURE FOR A FLEXIBLE AND HIGH-PERFORMANCE GATEWAY CABLE MODEM | | |

AMENDMENT AND RESPONSE TO OFFICE ACTION

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

| |
|------------------------------|
| Customer No. 65913 |
|------------------------------|

Dear Sir:

In acknowledgement of the non-final Office Action dated February 19, 2009,
please reconsider the application in view of the following amendments and remarks.

A complete listing of the claims, including any amendments, and
Remarks/Arguments follow.

App. Serial No. 10/675,566
Docket No.: 81373818US01

In the Claims:

Please amend the claims as indicated below.

1. (Currently Amended) A cable modem system comprising:

a data networking engine implemented in a first circuit that includes at least one processor, the data networking engine programmed with software that when executed by the at least one processor of the first circuit causes the data networking engine to perform that performs home data networking functions including interfacing with customer provided equipment; and

a cable modem engine implemented in a second circuit that includes at least one processor, the second circuit being separate from the first circuit, the cable modem engine programmed with software that when executed by the at least one processor of the second circuit causes the cable mode engine to perform that performs all other cable modem functions other than the home networking functions performed by the data networking engine, the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine; and

a data bus that connects the data networking engine to the cable modem engine, wherein the cable modem functions performed by the cable modem engine are being completely partitioned from the home networking functions performed by the data networking engine.

2. (Original) A cable modem system as claimed in claim 1, wherein all DOCSIS functions are localized in the cable modem engine.

3. (Original) A cable modem system as claimed in claim 2, wherein VoIP functionality is embedded in the cable modem engine.

4. (Currently Amended) A cable modem system as claimed in claim 1, and further comprising an advanced crypto engine configured to perform that performs all crypto functions for both the data networking engine and the cable modem engine, the advanced crypto engine being separate from both the data networking engine and the cable modem

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Docket No.: 81373818US01

engine.

5. (Currently Amended) A cable modem system as claimed in claim 1, wherein the cable modem engine includes ~~comprises~~:

- a DOCSIS PHY layer;
- a DOCSIS MAC processor; and
- a DOCSIS controller, and

wherein the at least one processor of the data networking engine is a RISC processor.

6. (Currently Amended) A cable modem system as claimed in claim 5, wherein the DOCSIS PHY layer includes ~~comprises~~ a hardware transmitter and receiver.

7. (Currently Amended) A cable modem system as claimed in claim 5, wherein the DOCSIS MAC processor is configured to process ~~processes~~ downstream PDU packets and forward ~~forwards~~ the processed packets directly to the data networking engine without the involvement of the DOCSIS controller in order to boost downstream throughput.

8. (Original) A cable modem system as claimed in claim 5, wherein all VoIP functionality is implemented in the DOCSIS controller.

9. (Original) A cable modem system as claimed in claim 8, wherein the VoIP functionality is in conformance with the PacketCable specification.

10. (Currently Amended) A cable modem system as claimed in claim 5, wherein the data networking engine is configured to perform ~~responsible for~~ all data networking processing including advanced multi-port bridging-bridging/routing with NAT/firewall and VPN, and home networking applications.

11. (Original) A cable modem system as claimed in claim 10, wherein the data networking engine comprises the entire embedded portal services functionality of the CableHome specification.

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Docket No.: 81373818US01

12. (Currently Amended) A cable modem architecture comprising:

a cable modem engine that includes ~~comprises~~:

a DOCSIS PHY layer comprising a transmitter and receiver;

a DOCSIS MAC processor configured to implement ~~that implements~~ real-time critical MAC functions for both upstream and downstream communications; and

a DOCSIS controller configured to implement ~~implementing~~ VoIP functionality; and

a data networking engine that includes a RISC processor configured to implement ~~implementing~~ all data networking processing and home networking applications, wherein the implementation of the data networking processing and home networking applications by the data networking engine is completely decoupled from the implementation of the MAC functions and the VoIP functionality by the cable modem engine.

13. (Currently Amended) A cable modem architecture as claimed in claim 12, wherein the DOCSIS controller is configured to provide ~~provides~~ VoIP functionality in accordance with the PacketCable specification, ~~and~~ wherein the data networking engine is configured to provide ~~provides~~ the embedded portal services functionality of the CableHome specification, and wherein the CableHome functionality is provided by the data networking engine is completely decoupled from the PacketCable and DOCSIS functionality provided by the cable modem engine.

14. (Original) A cable modem architecture as claimed in claim 13, wherein the DOCSIS MAC processor is an ARM9TDMI-based RISC processor, and wherein the DOCSIS controller is an ARM940-based RISC processor.

15. (Original) A method for providing a flexible and partitioned cable modem gateway comprising: providing data and home networking functionality in a data networking engine; providing DOCSIS and VoIP functionality in a cable modem engine; and partitioning the data networking engine from the cable modem engine so that the data and home networking functionality is completely decoupled from the DOCSIS and VoIP functionality.

App. Serial No. 10/675,566
Docket No.: 81373818US01

16. (New) A cable modem system as claimed in claim 5, wherein the data networking engine includes consumer provided equipment drivers including a USB driver and an Ethernet driver and the data networking engine is configured to provide the embedded portal services functionality of the CableHome specification, wherein the DOCSIS controller is configured to provide VoIP functionality in accordance with the PacketCable specification, and wherein the CableHome functionality provided by the data networking engine is completely decoupled from the PacketCable and DOCSIS functionality provided by the cable modem engine.

App. Serial No. 10/675,566
Docket No.: 81373818US01

Remarks

In the non-final Office Action dated February 19, 2009, the following grounds of rejection are presented: claims 1-15 stand rejected under 35 U.S.C. § 102(e) over Brooks (U.S. Patent Pub. 2001/0039600). In the following discussion, Applicant does not acquiesce in any regard to averments in this Office Action (unless Applicant expressly indicates otherwise).

Applicant respectfully traverses the § 102(e) rejection of claims 1-15 because the cited portions of the '600 reference do not correspond to aspects of the claimed invention directed to the data networking functions performed by a data networking engine being completely partitioned/decoupled from the other cable modem functions performed by a cable modem engine. The cited portions of the '600 reference teach a cable modem device 100 that includes two separate processors 102 and 104 (*see, e.g.*, Figure 1 and paragraphs 0024-0026, which are apparently being asserted as corresponding to the DOCSIS MAC processor and the DOCSIS controller of Applicant's cable modem engine (*see, e.g.*, claims 5-14). Applicant submits that the '600 reference does not teach a separate data networking engine (as claimed) that implements certain functionality in a manner that is completely partitioned/decoupled from the functionality performed by processors 102 and 104 of cable modem device 100. Specifically, the '600 reference teaches that the home-networking functionality is implemented by the same processors that implement the DOCSIS and VoIP functionality, instead of implementing these functionalities in a partitioned manner in separate engines, as claimed. Thus, the cited portions of the '600 reference do not correspond to the claimed invention.

Applicant notes that the Office Action does not identify what element of the '600 reference is being asserted as corresponding to Applicant's data networking engine. In fact, the Office Action fails to provide any explanation regarding which specific elements of the '600 reference (*e.g.*, processors 102 and 104) are alleged to correspond to any element of the claimed invention (*e.g.*, Applicant's data networking engine, cable modem engine, DOCSIS MAC processor and the DOCSIS controller). In order to comply with 35 U.S.C. § 132, sufficient detail must be provided by the Examiner regarding the alleged correspondence between the claimed invention and the cited reference to enable Applicant to adequately respond to the rejections. *See, also*, 37 CFR 1.104 ("The pertinence of each reference, if not apparent, must be clearly explained and each rejected

App. Serial No. 10/675,566
Docket No.: 81373818US01

claim specified.”) and M.P.E.P. § 706.02(j), (“It is important for an Examiner to properly communicate the basis for a rejection so that the issues can be identified early and the applicant can be given fair opportunity to reply.”). As such, should any rejection based on the ‘600 reference be maintained, Applicant respectfully requests that the Examiner specifically identify which element of the ‘600 reference is being alleged to correspond to each element of the claimed invention.

In view of the above, the § 102(e) rejection of claims 1-15 is improper and Applicant requests that it be withdrawn.

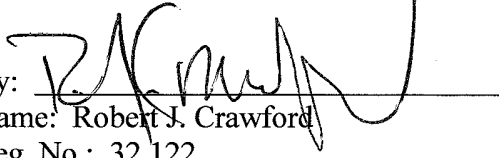
Applicant further traverses the § 102(e) rejection of various dependent claims because the Office Action fails to adequately address these claims. Regarding claim 7, the ‘600 reference does not teach that processor 102 (taught by the ‘600 reference to implement MAC functionality) processes PDU packets and forwards these packets to an apparently nonexistent data networking engine (as claimed) without the involvement of some other processor, which is not identified by the Office Action. Regarding claims 9, 11 and 13-14, the ‘600 reference does not teach that cable modem device 100 implements functionality of the PacketCable specification or functionality of the CableHome specification. In fact, the ‘600 reference does not make any mention of either the PacketCable specification or the CableHome specification. Accordingly, the § 102(e) rejection of claims 7, 9, 11 and 13-14 is improper and Applicant requests that it be withdrawn.

In view of the above, Applicant believes that each of the rejections is improper and should be withdrawn and that the application is in condition for allowance. Should there be any remaining issues that could be readily addressed over the telephone, the Examiner is asked to contact the agent overseeing the application file, David Cordeiro, of NXP Corporation at (408) 474-9063 (or the undersigned).

Please direct all correspondence to:

Corporate Patent Counsel
NXP Intellectual Property & Standards
1109 McKay Drive; Mail Stop SJ41
San Jose, CA 95131

CUSTOMER NO. 65913

By: 
Name: Robert J. Crawford
Reg. No.: 32,122
651-686-6633
(NXPS.615PA)

Electronic Acknowledgement Receipt

| | |
|---|--|
| EFS ID: | 5362874 |
| Application Number: | 10675566 |
| International Application Number: | |
| Confirmation Number: | 9980 |
| Title of Invention: | Architecture for a flexible and high-performance gateway cable modem |
| First Named Inventor/Applicant Name: | Gordon Y. Li |
| Customer Number: | 65913 |
| Filer: | Robert J. Crawford/Kelly Davis |
| Filer Authorized By: | Robert J. Crawford |
| Attorney Docket Number: | 81373818US01-02CXT0070D |
| Receipt Date: | 19-MAY-2009 |
| Filing Date: | 30-SEP-2003 |
| Time Stamp: | 17:01:02 |
| Application Type: | Utility under 35 USC 111(a) |

Payment information:

| | |
|------------------------|----|
| Submitted with Payment | no |
|------------------------|----|

File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|-----------------|----------------------|---------------------------|--|------------------|------------------|
| 1 | | 81373818US01_response.pdf | 326820 0a183edcebd36c4d5747626605e5741e9d dfb039 | yes | 7 |

Multipart Description/PDF files in .zip description

| | Document Description | Start | End |
|--|---|-------|-----|
| | Amendment/Req. Reconsideration-After Non-Final Reject | 1 | 1 |
| | Claims | 2 | 5 |
| | Applicant Arguments/Remarks Made in an Amendment | 6 | 7 |
| | | | |

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

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PTO/88/08 (10-07)

Approved for use through 08/30/2010, OMB 0851-0032
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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number

101675566

APPLICATION AS FILED - PART I

(Column 1)

(Column 2)

SMALL ENTITY

OR

OTHER THAN
SMALL ENTITY

| FOR | NUMBER FILED | NUMBER EXTRA |
|---|---|--------------|
| BASIC FEE (37 CFR 1.16(a), (b), or (c)) | N/A | N/A |
| SEARCH FEE (37 CFR 1.16(k), (l), or (m)) | N/A | N/A |
| EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | N/A | N/A |
| TOTAL CLAIMS (37 CFR 1.16(i)) | minus 20 = | |
| INDEPENDENT CLAIMS (37 CFR 1.16(i)) | minus 3 = | |
| APPLICATION SIZE FEE (37 CFR 1.16(s)) | If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$260 (\$130 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | |
| MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | |

| RATE (\$) | FEE (\$) |
|-----------|----------|
| N/A | |
| N/A | |
| N/A | |
| x 25 = | |
| x 105 = | |
| 185 | |
| TOTAL | |

| RATE (\$) | FEE (\$) |
|-----------|----------|
| N/A | |
| N/A | |
| N/A | |
| x 50 = | |
| x 210 = | |
| 370 | |
| TOTAL | |

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED - PART II

(Column 1)

(Column 2)

(Column 3)

SMALL ENTITY

OR

OTHER THAN
SMALL ENTITY

| | | | | | |
|-------------|---|----------------------------------|-------|------------------------------------|---------------|
| AMENDMENT A | | CLAIMS REMAINING AFTER AMENDMENT | | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA |
| | Total (37 CFR 1.16(i)) | 16 | Minus | 20 | = 4 |
| | Independent (37 CFR 1.16(i)) | 3 | Minus | 3 | = 0 |
| | Application Size Fee (37 CFR 1.16(s)) | | | | |
| | FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | |

| RATE (\$) | ADDITIONAL FEE (\$) |
|-----------------|---------------------|
| x 25 = | |
| x 105 = | |
| 185 | |
| TOTAL ADD'L FEE | |

| RATE (\$) | ADDITIONAL FEE (\$) |
|-----------------|---------------------|
| x 50 = | |
| x 210 = | |
| 370 | |
| TOTAL ADD'L FEE | |

| | | | | | |
|-------------|---|----------------------------------|-------|------------------------------------|---------------|
| AMENDMENT B | | CLAIMS REMAINING AFTER AMENDMENT | | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA |
| | Total (37 CFR 1.16(i)) | | Minus | | = |
| | Independent (37 CFR 1.16(i)) | | Minus | | = |
| | Application Size Fee (37 CFR 1.16(s)) | | | | |
| | FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | |

| RATE (\$) | ADDITIONAL FEE (\$) |
|-----------------|---------------------|
| x 25 = | |
| x 105 = | |
| 185 | |
| TOTAL ADD'L FEE | |

| RATE (\$) | ADDITIONAL FEE (\$) |
|-----------------|---------------------|
| x 50 = | |
| x 210 = | |
| 370 | |
| TOTAL ADD'L FEE | |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|-------------------------|------------------|
| 10/675,566 | 09/30/2003 | Gordon Y. Li | 81373818US01-02CXT0070D | 9980 |

| | | |
|-------|------|------------|
| 65913 | 7590 | 09/03/2009 |
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NXP, B.V.
 NXP INTELLECTUAL PROPERTY & LICENSING
 M/S41-SJ
 1109 MCKAY DRIVE
 SAN JOSE, CA 95131

| | |
|------------------|--|
| EXAMINER | |
| HOSSAIN, TANIM M | |

| | |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
| 2445 | |

| | |
|-------------------|---------------|
| NOTIFICATION DATE | DELIVERY MODE |
| 09/03/2009 | ELECTRONIC |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip.department.us@nxp.com

| | | | |
|------------------------------|--------------------------------------|----------------------------------|--|
| Office Action Summary | Application No. 10/675,566 | Applicant(s) LI ET AL. | |
| | Examiner Tanim Hossain | Art Unit 2445 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 5/19/09.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) _____ is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-16 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Application/Control Number: 10/675,566
Art Unit: 2445

Page 2

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-11 and 16, drawn to computer software upgrading, classified in class 717, subclass 168.
- II. Claims 12-15, drawn to network protocol implementation, classified in class 709, subclass 230.

Inventions I and II are related as subcombinations as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, Invention I discloses the upgrading of software for the system in an independent fashion. This specific upgrading concept is classified in class 717, subclass 168. On the other hand, Invention II includes the implementation and use of various protocols to employ different network functionalities, and is thus classified accordingly, in class 709, subclass 230. Both inventions may be implemented separately from one another.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classifications, restriction for examination purposes as indicated is proper.

Application/Control Number: 10/675,566
Art Unit: 2445

Page 3

Applicant is advised that the reply to this requirement to be complete must include an election of the invention to be examined even though the requirement be traversed (37 CFR 1.143).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tanim Hossain whose telephone number is (571)272-3881. The examiner can normally be reached on 8:30 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivek Srivastava can be reached on 571/272-7304. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Tanim Hossain
Patent Examiner
Art Unit 2445

Application/Control Number: 10/675,566
Art Unit: 2445

Page 4

/VIVEK SRIVASTAVA/

Supervisory Patent Examiner, Art Unit 2445

| | | |
|--|--|---|
| <i>Index of Claims</i>  | Application/Control No. 10675566 | Applicant(s)/Patent Under Reexamination LI ET AL. |
| | Examiner Tanim Hossain | Art Unit 2445 |

| | | | | | | | |
|---|-----------------|---|-------------------|---|---------------------|---|-----------------|
| ✓ | Rejected | - | Cancelled | N | Non-Elected | A | Appeal |
| = | Allowed | ÷ | Restricted | I | Interference | O | Objected |

☐ Claims renumbered in the same order as presented by applicant

☐ CPA

☐ T.D.

☐ R.1.47

| CLAIM | | DATE | | | | | | | | |
|-------|----------|------------|------------|--|--|--|--|--|--|--|
| Final | Original | 02/16/2009 | 08/24/2009 | | | | | | | |
| | 1 | ✓ | ÷ | | | | | | | |
| | 2 | ✓ | ÷ | | | | | | | |
| | 3 | ✓ | ÷ | | | | | | | |
| | 4 | ✓ | ÷ | | | | | | | |
| | 5 | ✓ | ÷ | | | | | | | |
| | 6 | ✓ | ÷ | | | | | | | |
| | 7 | ✓ | ÷ | | | | | | | |
| | 8 | ✓ | ÷ | | | | | | | |
| | 9 | ✓ | ÷ | | | | | | | |
| | 10 | ✓ | ÷ | | | | | | | |
| | 11 | ✓ | ÷ | | | | | | | |
| | 12 | ✓ | ÷ | | | | | | | |
| | 13 | ✓ | ÷ | | | | | | | |
| | 14 | ✓ | ÷ | | | | | | | |
| | 15 | ✓ | ÷ | | | | | | | |
| | 16 | | ÷ | | | | | | | |

To: ip.department.us@nxp.com,,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 65913

Sep 03, 2009 05:45:53 AM

Dear PAIR Customer:

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NXP INTELLECTUAL PROPERTY & LICENSING
M/S41-SJ
1109 MCKAY DRIVE
SAN JOSE, CA 95131
UNITED STATES

The following USPTO patent application(s) associated with your Customer Number, 65913 , have new outgoing correspondence. This correspondence is now available for viewing in Private PAIR.

The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

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| Application | Document | Mailroom Date | Attorney Docket No. |
|-------------|----------|---------------|-------------------------|
| 10675566 | CTRS | 09/03/2009 | 81373818US01-02CXT0070D |

To view your correspondence online or update your email addresses, please visit us anytime at <https://sportal.uspto.gov/secure/myportal/privatepair>.

If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov with 'e-Office Action' on the subject line or call 1-866-217-9197 during the following hours:

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Confirmation No. 9980

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

| | | | |
|-------------|---|-----------------|------------------------------|
| Applicant: | LI <i>et al.</i> | Examiner: | Hossain, Tanim |
| Serial No.: | 10/675,566 | Group Art Unit: | 2445 |
| Filed: | September 30, 2003 | Docket No.: | 81373818US01 (NXPS.615PA) |
| Title: | ARCHITECTURE FOR A FLEXIBLE AND HIGH-PERFORMANCE GATEWAY CABLE MODEM | | |

RESPONSE TO ELECTION/RESTRICTION

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

| |
|------------------------------|
| Customer No. 65913 |
|------------------------------|

Dear Sir:

This communication is in reply to the Office Action dated September 3, 2009 in which a restriction/election requirement was presented.

A complete listing of the Claims, to include any amendments thereto, and the Remarks follow.

App. Serial No. 10/675,566
Docket No.: 81373818US01

In the Claims:

1. (Previously presented) A cable modem system comprising:

a data networking engine implemented in a first circuit that includes at least one processor, the data networking engine programmed with software that when executed by the at least one processor of the first circuit causes the data networking engine to perform home networking functions including interfacing with customer provided equipment;

a cable modem engine implemented in a second circuit that includes at least one processor, the second circuit being separate from the first circuit, the cable modem engine programmed with software that when executed by the at least one processor of the second circuit causes the cable mode engine to perform cable modem functions other than the home networking functions performed by the data networking engine, the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine; and

a data bus that connects the data networking engine to the cable modem engine, wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine.

2. (Original) A cable modem system as claimed in claim 1, wherein all DOCSIS functions are localized in the cable modem engine.

3. (Original) A cable modem system as claimed in claim 2, wherein VoIP functionality is embedded in the cable modem engine.

4. (Previously presented) A cable modem system as claimed in claim 1, and further comprising an advanced crypto engine configured to perform all crypto functions for both the data networking engine and the cable modem engine, the advanced crypto engine being separate from both the data networking engine and the cable modem engine.

App. Serial No. 10/675,566
Docket No.: 81373818US01

5. (Previously presented) A cable modem system as claimed in claim 1, wherein the cable modem engine includes:

- a DOCSIS PHY layer;
- a DOCSIS MAC processor; and
- a DOCSIS controller, and

wherein the at least one processor of the data networking engine is a RISC processor.

6. (Previously presented) A cable modem system as claimed in claim 5, wherein the DOCSIS PHY layer includes a hardware transmitter and receiver.

7. (Previously presented) A cable modem system as claimed in claim 5, wherein the DOCSIS MAC processor is configured to process downstream PDU packets and forward the processed packets directly to the data networking engine without the involvement of the DOCSIS controller in order to boost downstream throughput.

8. (Original) A cable modem system as claimed in claim 5, wherein all VoIP functionality is implemented in the DOCSIS controller.

9. (Original) A cable modem system as claimed in claim 8, wherein the VoIP functionality is in conformance with the PacketCable specification.

10. (Previously presented) A cable modem system as claimed in claim 5, wherein the data networking engine is configured to perform all data networking processing including advanced multi-port bridging routing with NAT/firewall and VPN, and home networking applications.

11. (Original) A cable modem system as claimed in claim 10, wherein the data networking engine comprises the entire embedded portal services functionality of the CableHome specification.

12. (Currently amended) A cable modem system as claimed in claim 5, wherein the
~~architecture comprising:~~ a cable modem engine ~~that~~ includes:

App. Serial No. 10/675,566
 Docket No.: 81373818US01

the [[a]] DOCSIS PHY layer includes ~~comprising~~ a transmitter and receiver;

the [[a]] DOCSIS MAC processor is configured to implement real-time ~~critical~~ MAC functions for both upstream and downstream communications; and

the [[a]] DOCSIS controller is configured to implement VoIP functionality; and wherein

the [[a]] data networking engine ~~that~~ includes a RISC processor configured to implement substantially all data networking processing and home networking applications, ~~wherein the implementation of the data networking processing and home networking applications by the data networking engine is completely~~ decoupled from the implementation of the MAC functions and the VoIP functionality of ~~by~~ the cable modem engine.

13. (Previously presented) A cable modem architecture as claimed in claim 12, wherein the DOCSIS controller is configured to provide VoIP functionality in accordance with the PacketCable specification, wherein the data networking engine is configured to provide the embedded portal services functionality of the CableHome specification, and wherein the CableHome functionality provided by the data networking engine is completely decoupled from the PacketCable and DOCSIS functionality provided by the cable modem engine.

14. (Original) A cable modem architecture as claimed in claim 13, wherein the DOCSIS MAC processor is an ARM9TDMI-based RISC processor, and wherein the DOCSIS controller is an ARM940-based RISC processor.

15. (Original) A method for providing a flexible and partitioned cable modem gateway comprising: providing data and home networking functionality in a data networking engine; providing DOCSIS and VoIP functionality in a cable modem engine; and partitioning the data networking engine from the cable modem engine so that the data and home networking functionality is completely decoupled from the DOCSIS and VoIP functionality.

App. Serial No. 10/675,566
Docket No.: 81373818US01

16. (Previously presented) A cable modem system as claimed in claim 5, wherein the data networking engine includes consumer provided equipment drivers including a USB driver and an Ethernet driver and the data networking engine is configured to provide the embedded portal services functionality of the CableHome specification, wherein the DOCSIS controller is configured to provide VoIP functionality in accordance with the PacketCable specification, and wherein the CableHome functionality provided by the data networking engine is completely decoupled from the PacketCable and DOCSIS functionality provided by the cable modem engine.

App. Serial No. 10/675,566
Docket No.: 81373818US01

Remarks

In the Office Action dated September 3, 2009, a Restriction/Election was made, requesting that Applicant elect either Group I (consisting of claims 1-11 and 16) or Group II (consisting of claims 12-15). Applicant elects the claims identified under Group I (claims 1-11, 12-14 as amended and 16) with traverse. Applicant respectfully submits that the rationale used in support of the restrictions does not comply with the rules and guidelines set forth in the M.P.E.P. Applicant submits that the restrictions should be withdrawn.

The Office Action asserts that the inventions of Groups I and II are related as subcombinations as usable together in a single combination and that both inventions may be implemented separately from one another. Specifically, the Office Action asserts that the invention of Group I “discloses the upgrading of software for the system in an independent fashion” and the invention of Group II “includes the implementation and use of various protocols to employ different network functionalities.”

Applicant traverses for lack of compliance with the restriction guidelines in the M.P.E.P. and because no basis has been provided to support the separate use conclusion in the Office Action.

Notwithstanding, Applicant has amended claim 12 to comport to the scope presented in the Office Action.

Accordingly, Applicants respectfully requests that the Examiner withdraw the present restriction requirement(s) for examination of all the claims.

App. Serial No. 10/675,566
Docket No.: 81373818US01

In view of the above, Applicant believes that each of the rejections is improper and should be withdrawn and that the application is in condition for allowance. Should there be any remaining issues that could be readily addressed over the telephone, the Examiner is asked to contact the agent overseeing the application file, Peter Zawilski, of NXP Corporation at (408) 474-9063 (or the undersigned).

Please direct all correspondence to:

Corporate Patent Counsel
NXP Intellectual Property & Standards
1109 McKay Drive; Mail Stop SJ41
San Jose, CA 95131

CUSTOMER NO. 65913

By: 

Name: Robert J. Crawford

Reg. No.: 32,122

651-686-6633

(NXPS.615PA)

Electronic Acknowledgement Receipt

| | |
|---|--|
| EFS ID: | 6202616 |
| Application Number: | 10675566 |
| International Application Number: | |
| Confirmation Number: | 9980 |
| Title of Invention: | Architecture for a flexible and high-performance gateway cable modem |
| First Named Inventor/Applicant Name: | Gordon Y. Li |
| Customer Number: | 65913 |
| Filer: | Robert J. Crawford/Kelly Davis |
| Filer Authorized By: | Robert J. Crawford |
| Attorney Docket Number: | 81373818US01-02CXT0070D |
| Receipt Date: | 05-OCT-2009 |
| Filing Date: | 30-SEP-2003 |
| Time Stamp: | 15:37:03 |
| Application Type: | Utility under 35 USC 111(a) |

Payment information:

| | |
|------------------------|----|
| Submitted with Payment | no |
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File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|-----------------|----------------------|---------------------------|--|------------------|------------------|
| 1 | | 81373818US01_response.pdf | 261101 e4476c5e6f4367403a4b9650ed67b62dd69c90fc | yes | 7 |

Multipart Description/PDF files in .zip description

| | Document Description | Start | End |
|--|--|-------|-----|
| | Response to Election / Restriction Filed | 1 | 1 |
| | Claims | 2 | 5 |
| | Applicant Arguments/Remarks Made in an Amendment | 6 | 7 |

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

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PTO/SB/06 (07-06)

Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

| PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875 | | | | | Application or Docket Number 10/675,566 | | Filing Date 09/30/2003 | | <input type="checkbox"/> To be Mailed | |
|---|--|----------------------------------|-----------|--|---|-------------------------|----------------------------------|-------------------------|---------------------------------------|---------------------|
| APPLICATION AS FILED – PART I | | | | | | | | | | |
| (Column 1) | | (Column 2) | | SMALL ENTITY <input type="checkbox"/> OR | | OTHER THAN SMALL ENTITY | | | | |
| FOR | NUMBER FILED | NUMBER EXTRA | RATE (\$) | FEE (\$) | OR | RATE (\$) | FEE (\$) | | | |
| <input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c)) | N/A | N/A | N/A | | | N/A | | | | |
| <input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m)) | N/A | N/A | N/A | | | N/A | | | | |
| <input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | N/A | N/A | N/A | | | N/A | | | | |
| TOTAL CLAIMS (37 CFR 1.16(i)) | minus 20 = | * | X \$ | = | OR | X \$ | = | | | |
| INDEPENDENT CLAIMS (37 CFR 1.16(h)) | minus 3 = | * | X \$ | = | | X \$ | = | | | |
| <input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s)) If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | | | | | | | | |
| | | | | | | | | | | |
| <input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | | | | | | | | | |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | | | TOTAL | | | | |
| APPLICATION AS AMENDED – PART II | | | | | | | | | | |
| (Column 1) | | (Column 2) | | (Column 3) | | SMALL ENTITY OR | | OTHER THAN SMALL ENTITY | | |
| AMENDMENT | 10/05/2009 | CLAIMS REMAINING AFTER AMENDMENT | | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | RATE (\$) | ADDITIONAL FEE (\$) | | RATE (\$) | ADDITIONAL FEE (\$) |
| | Total (37 CFR 1.16(i)) | * 16 | Minus | ** 20 | = 0 | X \$ | = | OR | X \$52= | 0 |
| | Independent (37 CFR 1.16(h)) | * 2 | Minus | ***3 | = 0 | X \$ | = | OR | X \$220= | 0 |
| | <input type="checkbox"/> Application Size Fee (37 CFR 1.16(s)) | | | | | | | | | |
| | <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | | OR | | |
| | | | | | TOTAL ADD'L FEE | | OR | TOTAL ADD'L FEE | 0 | |
| (Column 1) | | (Column 2) | | (Column 3) | | SMALL ENTITY OR | | OTHER THAN SMALL ENTITY | | |
| AMENDMENT | | CLAIMS REMAINING AFTER AMENDMENT | | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | RATE (\$) | ADDITIONAL FEE (\$) | | RATE (\$) | ADDITIONAL FEE (\$) |
| | Total (37 CFR 1.16(i)) | * | Minus | ** | = | X \$ | = | OR | X \$ | = |
| | Independent (37 CFR 1.16(h)) | * | Minus | *** | = | X \$ | = | OR | X \$ | = |
| | <input type="checkbox"/> Application Size Fee (37 CFR 1.16(s)) | | | | | | | | | |
| | <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | | OR | | |
| | | | | | TOTAL ADD'L FEE | | OR | TOTAL ADD'L FEE | | |
| * If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1. | | | | | | | | | | |

Legal Instrument Examiner:
/CATHERINE d. SMITH/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
| 10/675,566 | 09/30/2003 | Gordon Y. Li | 81373818US01-02CXT0070D | 9980 |
| 65913 | 7590 | 02/05/2010 | | |
| NXP, B.V. NXP INTELLECTUAL PROPERTY & LICENSING M/S41-SJ 1109 MCKAY DRIVE SAN JOSE, CA 95131 | | | EXAMINER HOSSAIN, TANIM M | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2445 | |
| | | | NOTIFICATION DATE | DELIVERY MODE |
| | | | 02/05/2010 | ELECTRONIC |

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The time period for reply, if any, is set in the attached communication.

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ip.department.us@nxp.com

| | | | |
|------------------------------|--------------------------------------|----------------------------------|--|
| Office Action Summary | Application No. 10/675,566 | Applicant(s) LI ET AL. | |
| | Examiner Tanim Hossain | Art Unit 2445 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 October 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Claim Objections

Claim 1 is objected to because of the following informalities: The term, “the cable mode engine” in line 9 appears to be a typographical error. Appropriate correction is required.

Election/Restriction

The restriction requirement filed on September 3, 2009 is hereby withdrawn.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 12 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 12 discloses that the data networking engine includes a RISC processor, which is not supported by the specification.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 12 -14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 12 contains the term “substantially” The term is not defined in the specification rendering the claim indefinite. Other claims are dependent from claim 12.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Brooks (U.S. 2001/0039600).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention “by another,” or by an appropriate showing under 37 CFR 1.131.

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As per claim 1, Brooks teaches a cable modem system comprising: a data networking engine implemented in a first circuit that includes at least one processor (Figure 2), the data networking engine programmed with software that when executed by the at least one processor of the first circuit causes the data networking engine to perform home networking functions including interfacing with customer provided equipment (Abstract; paragraphs 0014, 0026, 0037, 0066-0068); a cable modem engine implemented in a second circuit that includes at least one processor, the second circuit being separate from the first circuit, the cable modem engine programmed with software that when executed by the at least one processor of the second circuit causes the cable modem engine to perform cable modem functions other than the home networking functions performed by the data networking engine, the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine (paragraphs 0026, 0037, 0042-0046, 0050-0052); a data bus that connects the data networking engine to the cable modem engine, wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine (0042-0046).

As per claim 2, Brooks teaches a cable modem system as claimed in claim 1, wherein all DOCSIS functions are localized in the cable modem engine (0024-0026).

As per claim 3, Brooks teaches a cable modem system as claimed in claim 2, wherein VoIP functionality is embedded in the cable modem engine (0024-0026).

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As per claim 4, Brooks teaches a cable modem system as claimed in claim 1, and further comprising an advanced crypto engine that performs all crypto functions (0013).

As per claim 5, Brooks teaches a cable modem system as claimed in claim 1, wherein the cable modem engine comprises: a DOCSIS PHY layer (0024-0026); a DOCSIS MAC processor (0024-0026); and a DOCSIS controller (0024-0026).

As per claim 6, Brooks teaches a cable modem system as claimed in claim 5, wherein the DOCSIS PHY layer comprises a hardware transmitter and receiver (0013, 0024-0026).

As per claim 7, Brooks teaches a cable modem system as claimed in claim 5, wherein the DOCSIS MAC processor processes downstream PDU packets and forwards the processed packets directly to the data networking engine without the involvement of the DOCSIS controller in order to boost downstream throughput (0024-0026, 0028).

As per claim 8, Brooks teaches a cable modem system as claimed in claim 5, wherein all VoIP functionality is implemented in the DOCSIS controller (0024-0026).

As per claim 9, Brooks teaches a cable modem system as claimed in claim 8, wherein the VoIP functionality is in conformance with the PacketCable specification (0024-0026).

As per claim 10, Brooks teaches a cable modem system as claimed in claim 5, wherein the data networking engine is responsible for all data networking processing including advanced

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multi-port bridging/routing with NAT/firewall and VPN, and home networking applications (0024-0026, 0030).

As per claim 11, Brooks teaches a cable modem system as claimed in claim 10, wherein the data networking engine comprises the entire embedded portal services functionality of the CableHome specification (0024-0026).

As per claim 12, Brooks teaches a cable modem as claimed in claim 5, wherein the cable modem engine includes: the DOCSIS PHY layer includes a transmitter and receiver (0030); the DOCSIS MAC processor is configured to implement real-time MAC functions for both upstream and downstream communications (0053-0054); the DOCSIS controller is configured to implement VoIP functionality (0025); and wherein the data networking engine includes a RISC processor configured to implement all data networking processing and home networking applications, decoupled from the implementation of the MAC functions and the VoIP functionality of the cable modem engine (0037, 0043-0045).

As per claim 13, Brooks teaches a cable modem architecture as claimed in claim 12, wherein the DOCSIS controller provides VoIP functionality in accordance with the PacketCable specification, and wherein the data networking engine provides the embedded portal services functionality of the CableHome specification, wherein the CableHome functionality provided by the data networking engine is completely decoupled from the PacketCable and DOCSIS functionality provided by the cable modem engine (0013-0016, 0024-0026).

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As per claim 14, Brooks teaches a cable modem architecture as claimed in claim 13, wherein the DOCSIS MAC processor is an ARM9TDMI-based RISC processor, and wherein the DOCSIS controller is an ARM940-based RISC processor (0013-0016, 0024-0026, 0037).

As per claim 15, Brooks teaches a method for providing a flexible and partitioned cable modem gateway comprising: providing data and home networking functionality in a data networking engine; providing DOCSIS and VoIP functionality in a cable modem engine (0013-0016, 0024-0026); and partitioning the data networking engine from the cable modem engine so that the data and home networking functionality is completely decoupled from the DOCSIS and VoIP functionality (0013-0016, 0024-0026).

As per claim 16, Brooks teaches a cable modem system as claimed in claim 5, wherein the data networking engine includes consumer provided equipment drivers including a USB driver and an Ethernet driver and the data networking engine is configured to provide the embedded portal services functionality of the CableHome specification, wherein the DOCSIS controller is configured to provide VoIP functionality in accordance with the PacketCable specification, and wherein the CableHome functionality provided by the data networking engine is completely decoupled from the PacketCable and DOCSIS functionality provided by the cable modem engine (0044-0045).

Response to Remarks

Applicant's remarks filed on May 19, 2009 have fully been considered.

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The data networking engine and cable modem engines are represented in figures 1 and 2 of the Brooks reference, including buses carrying out separate networking functions. For example, the data networking engine interfaces with the peripheral devices and employs operating system functions, and the cable modem engine implements DOCSIS functionality. These entities are completely partitioned from each other, as discussed in the cited sections.

Paragraphs 0036-0042 discuss the transfer of packets between the cable modem and data networking engines. Therefore, examiner respectfully disagrees with the assertion that there is no data networking engine, and it is respectfully submitted that the Brooks invention fully teaches the limitations of claim 7. Further, paragraph 0010 discusses the inclusion of various CableLabs standards. Because PacketCable and CableHome specifications constitute these standards, Brooks fully teaches the claim limitations.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tanim Hossain whose telephone number is (571)272-3881. The examiner can normally be reached on 8:30 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivek Srivastava can be reached on 571/272-7304. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Tanim Hossain
Patent Examiner
Art Unit 2445

/Nabil El-Hady/
Supervisory Patent Examiner, Art Unit 4191

| | | |
|--|--|---|
| <i>Index of Claims</i>  | Application/Control No. 10675566 | Applicant(s)/Patent Under Reexamination LI ET AL. |
| | Examiner Tanim Hossain | Art Unit 2445 |

| | | | | | | | |
|---|-----------------|---|-------------------|---|---------------------|---|-----------------|
| ✓ | Rejected | - | Cancelled | N | Non-Elected | A | Appeal |
| = | Allowed | ÷ | Restricted | I | Interference | O | Objected |

| <input type="checkbox"/> Claims renumbered in the same order as presented by applicant | | | | | | <input type="checkbox"/> CPA | | <input type="checkbox"/> T.D. | | <input type="checkbox"/> R.1.47 | |
|--|----------|------------|------------|------------|--|------------------------------|--|-------------------------------|--|---------------------------------|--|
| CLAIM | | DATE | | | | | | | | | |
| Final | Original | 02/16/2009 | 08/24/2009 | 01/30/2010 | | | | | | | |
| | 1 | ✓ | ÷ | ✓ | | | | | | | |
| | 2 | ✓ | ÷ | ✓ | | | | | | | |
| | 3 | ✓ | ÷ | ✓ | | | | | | | |
| | 4 | ✓ | ÷ | ✓ | | | | | | | |
| | 5 | ✓ | ÷ | ✓ | | | | | | | |
| | 6 | ✓ | ÷ | ✓ | | | | | | | |
| | 7 | ✓ | ÷ | ✓ | | | | | | | |
| | 8 | ✓ | ÷ | ✓ | | | | | | | |
| | 9 | ✓ | ÷ | ✓ | | | | | | | |
| | 10 | ✓ | ÷ | ✓ | | | | | | | |
| | 11 | ✓ | ÷ | ✓ | | | | | | | |
| | 12 | ✓ | ÷ | ✓ | | | | | | | |
| | 13 | ✓ | ÷ | ✓ | | | | | | | |
| | 14 | ✓ | ÷ | ✓ | | | | | | | |
| | 15 | ✓ | ÷ | ✓ | | | | | | | |
| | 16 | | ÷ | ✓ | | | | | | | |

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| Search Notes  | Application/Control No. 10675566 | Applicant(s)/Patent Under Reexamination LI ET AL. |
| | Examiner Tanim Hossain | Art Unit 2445 |

| SEARCHED | | | |
|----------|----------|------|----------|
| Class | Subclass | Date | Examiner |
| | | | |

| SEARCH NOTES | | |
|--------------|---------|----------|
| Search Notes | Date | Examiner |
| EAST | 2/16/09 | TH |
| EAST | 1/30/10 | TH |

| INTERFERENCE SEARCH | | | |
|---------------------|----------|------|----------|
| Class | Subclass | Date | Examiner |
| | | | |

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EAST Search History**EAST Search History (Prior Art)**

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|--------------|-------------|--|--------------------|-------------------------|----------------|---------------------|
| L1 | 3981 | docsis | US-PGPUB; USPAT | OR | OFF | 2010/01/30 19:52 |
| L2 | 3546 | docsis and modem\$4 | US-PGPUB; USPAT | OR | OFF | 2010/01/30 19:52 |
| L3 | 505 | docsis and modem\$4 and partition\$4 | US-PGPUB; USPAT | OR | OFF | 2010/01/30 19:52 |
| L4 | 518 | docsis and modem\$4 and (partition\$4 or bifurcat\$) | US-PGPUB; USPAT | OR | OFF | 2010/01/30 19:52 |
| L5 | 184 | docsis and modem\$4 and ((partition\$4 or bifurcat\$) same function \$7) | US-PGPUB; USPAT | OR | OFF | 2010/01/30 19:53 |
| L6 | 52 | docsis and modem\$4 and ((partition\$4 or bifurcat\$) same function \$7) and risc | US-PGPUB; USPAT | OR | OFF | 2010/01/30 19:53 |
| S1 | 28271 | cable\$4 near2 modem\$4 | US-PGPUB; USPAT | OR | OFF | 2009/02/16 05:09 |
| S2 | 2625 | (cable\$4 near2 modem \$4) and docsis | US-PGPUB; USPAT | OR | OFF | 2009/02/16 05:09 |
| S3 | 482 | (cable\$4 near2 modem \$4).ab. and docsis | US-PGPUB; USPAT | OR | OFF | 2009/02/16 05:10 |

| | | | | | | |
|----|-----|--|------------------------|----|-----|---------------------|
| S4 | 91 | (cable\$4 near2 modem \$4).ab. and docsis and ((integrat\$4 with (function \$4 or service \$4) same modem\$4)) | US- PGPUB; USPAT | OR | OFF | 2009/02/16 05:12 |
| S5 | 21 | (cable\$4 near2 modem \$4).ab. and docsis and ((integrat\$4 with (function \$4 or service \$4) same modem\$4)) and partition \$4 | US- PGPUB; USPAT | OR | OFF | 2009/02/16 05:12 |
| S6 | 13 | (cable\$4 near2 modem \$4).ab. and docsis and ((integrat\$4 with (function \$4 or service \$4) same modem\$4)) and partition \$4 and voip\$4 | US- PGPUB; USPAT | OR | OFF | 2009/02/16 05:12 |
| S7 | 230 | (cable\$4 near2 modem \$4).ab. and docsis and ((integrat\$4 or multipl\$4 or pluralit\$4) with (function \$4 or service \$4) same modem\$4) | US- PGPUB; USPAT | OR | OFF | 2009/02/16 05:25 |

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|----|----|---|------------------------|----|-----|---------------------|
| S8 | 35 | (cable\$4 near2 modem \$4).ti. and docsis and ((integrat\$4 with (function \$4 or service \$4) same modem\$4)) | US- PGPUB; USPAT | OR | OFF | 2009/02/16 05:26 |
| S9 | 94 | (cable\$4 near2 modem \$4).ti. and docsis and ((integrat\$4 or multipl\$4 or pluralit\$4) with (function \$4 or service \$4) same modem\$4) | US- PGPUB; USPAT | OR | OFF | 2009/02/16 05:27 |

1/30/10 7:58:05 PM

**C:\Documents and Settings\thossain\My Documents\EAST\Workspaces
 \10675566 Li - Multiple Function Cable Modem.wsp**

To: ip.department.us@nxp.com,,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 65913

Feb 05, 2010 05:44:51 AM

Dear PAIR Customer:

NXP, B.V.
NXP INTELLECTUAL PROPERTY & LICENSING
M/S41-SJ
1109 MCKAY DRIVE
SAN JOSE, CA 95131
UNITED STATES

The following USPTO patent application(s) associated with your Customer Number, 65913 , have new outgoing correspondence. This correspondence is now available for viewing in Private PAIR.

The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

Disclaimer:

The list of documents shown below is provided as a courtesy and is not part of the official file wrapper. The content of the images shown in PAIR is the official record.

| Application | Document | Mailroom Date | Attorney Docket No. |
|-------------|----------|---------------|-------------------------|
| 10675566 | CTFR | 02/05/2010 | 81373818US01-02CXT0070D |

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Monday - Friday 6:00 a.m. to 12:00 a.m.

Thank you for prompt attention to this notice,

UNITED STATES PATENT AND TRADEMARK OFFICE
PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

Reply under 37 C.F.R. 1.116
Expedited Procedure
Technology Center 2445

Confirmation No. 9980

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

| | | | |
|-------------|---|-----------------|------------------------------|
| Applicant: | LI <i>et al.</i> | Examiner: | Hossain, Tanim |
| Serial No.: | 10/675,566 | Group Art Unit: | 2445 |
| Filed: | September 30, 2003 | Docket No.: | 81373818US01 (NXPS.615PA) |
| Title: | ARCHITECTURE FOR A FLEXIBLE AND HIGH-PERFORMANCE GATEWAY CABLE MODEM | | |

**REQUEST TO WITHDRAW FINALITY AND
RESPONSE TO FINAL OFFICE ACTION**

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

| |
|------------------------------|
| Customer No. 65913 |
|------------------------------|

Dear Sir:

In acknowledgement of the Final Office Action dated February 5, 2010, please reconsider the application in view of the following amendments and remarks.

A complete listing of the claims, including any amendments, and Remarks/Arguments follow.

Authorization is given to charge/credit **Deposit Account 50-4019 (81373818US01)** all required fees/overages to enter this paper.

App. Serial No. 10/675,566
Docket No.: 81373818US01

In the Claims:

1. (Currently amended) A cable modem system comprising:

a data networking engine implemented in a first circuit that includes at least one processor, the data networking engine programmed with software that when executed by the at least one processor of the first circuit causes the data networking engine to perform home networking functions including interfacing with customer provided equipment;

a cable modem engine implemented in a second circuit that includes at least one processor, the second circuit being separate from the first circuit, the cable modem engine programmed with software that when executed by the at least one processor of the second circuit causes the cable modem ~~mode~~ engine to perform cable modem functions other than the home networking functions performed by the data networking engine, the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine; and

a data bus that connects the data networking engine to the cable modem engine,

wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine.

2. (Original) A cable modem system as claimed in claim 1, wherein all DOCSIS functions are localized in the cable modem engine.

3. (Original) A cable modem system as claimed in claim 2, wherein VoIP functionality is embedded in the cable modem engine.

4. (Previously presented) A cable modem system as claimed in claim 1, and further comprising an advanced crypto engine configured to perform all crypto functions for both the data networking engine and the cable modem engine, the advanced crypto engine being separate from both the data networking engine and the cable modem engine.

App. Serial No. 10/675,566
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5. (Previously presented) A cable modem system as claimed in claim 1, wherein the cable modem engine includes:

- a DOCSIS PHY layer;
- a DOCSIS MAC processor; and
- a DOCSIS controller, and

wherein the at least one processor of the data networking engine is a RISC processor.

6. (Previously presented) A cable modem system as claimed in claim 5, wherein the DOCSIS PHY layer includes a hardware transmitter and receiver.

7. (Previously presented) A cable modem system as claimed in claim 5, wherein the DOCSIS MAC processor is configured to process downstream PDU packets and forward the processed packets directly to the data networking engine without the involvement of the DOCSIS controller in order to boost downstream throughput.

8. (Original) A cable modem system as claimed in claim 5, wherein all VoIP functionality is implemented in the DOCSIS controller.

9. (Original) A cable modem system as claimed in claim 8, wherein the VoIP functionality is in conformance with the PacketCable specification.

10. (Previously presented) A cable modem system as claimed in claim 5, wherein the data networking engine is configured to perform all data networking processing including advanced multi-port bridging routing with NAT/firewall and VPN, and home networking applications.

11. (Original) A cable modem system as claimed in claim 10, wherein the data networking engine comprises the entire embedded portal services functionality of the CableHome specification.

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Docket No.: 81373818US01

12. (Currently Amended) A cable modem system as claimed in claim 5, wherein the cable modem engine includes:

the DOCSIS PHY layer includes a transmitter and receiver;

the DOCSIS MAC processor is configured to implement real-time MAC functions for both upstream and downstream communications; and

the DOCSIS controller is configured to implement VoIP functionality; and

wherein

the data networking engine ~~that~~ includes a RISC processor configured to implement ~~substantially all~~ a majority of data networking processing and home networking applications decoupled from the implementation of the MAC functions and the VoIP functionality of the cable modem engine.

13. (Previously presented) A cable modem architecture as claimed in claim 12, wherein the DOCSIS controller is configured to provide VoIP functionality in accordance with the PacketCable specification, wherein the data networking engine is configured to provide the embedded portal services functionality of the CableHome specification, and wherein the CableHome functionality provided by the data networking engine is completely decoupled from the PacketCable and DOCSIS functionality provided by the cable modem engine.

14. (Original) A cable modem architecture as claimed in claim 13, wherein the DOCSIS MAC processor is an ARM9TDMI-based RISC processor, and wherein the DOCSIS controller is an ARM940-based RISC processor.

15. (Original) A method for providing a flexible and partitioned cable modem gateway comprising: providing data and home networking functionality in a data networking engine; providing DOCSIS and VoIP functionality in a cable modem engine; and partitioning the data networking engine from the cable modem engine so that the data and home networking functionality is completely decoupled from the DOCSIS and VoIP functionality.

App. Serial No. 10/675,566
Docket No.: 81373818US01

16. (Previously presented) A cable modem system as claimed in claim 5, wherein the data networking engine includes consumer provided equipment drivers including a USB driver and an Ethernet driver and the data networking engine is configured to provide the embedded portal services functionality of the CableHome specification, wherein the DOCSIS controller is configured to provide VoIP functionality in accordance with the PacketCable specification, and wherein the CableHome functionality provided by the data networking engine is completely decoupled from the PacketCable and DOCSIS functionality provided by the cable modem engine.

App. Serial No. 10/675,566
 Docket No.: 81373818US01

Remarks

In the non-final Office Action dated February 5, 2010, the following grounds of rejection are presented: claim 1 is objected to as to informalities; claim 12 is rejected under 35 U.S.C § 112, first paragraph as failing to comply with the written description requirement; claims 12-14 are rejected under 35 U.S.C § 112, second paragraph as being indefinite; claims 1-16 stand rejected under 35 U.S.C. § 102(e) over Brooks (U.S. Patent Pub. 2001/0039600). In the following discussion, Applicant does not acquiesce in any regard to averments in this Office Action (unless Applicant expressly indicates otherwise).

Applicant has amended claim 1 to correct a typographical error, and requests that the objection be removed.

Applicant respectfully traverses the § 102(e) rejection of claims 1-16 because the cited portions of the ‘600 reference do not correspond to aspects of the claimed invention. For example, Applicant is uncertain how the ‘600 reference discloses aspects of the claimed invention directed to data networking functions performed by a data networking engine being completely partitioned/decoupled from the other cable modem functions performed by a cable modem engine. The Examiner has repeatedly failed to identify elements of the ‘600 reference corresponding to these aspects as requested. In contrast, the Office Action make the conclusion statement that “the data networking engine and cable modem engines are represented in Figures 1 and 2 of the [‘600] reference” (*see, e.g.,* p. 8 of the Office Action). However, Applicant is uncertain how any reasonable interpretation of these Figures can provide correspondence. For example, Figure 2 of the ‘600 reference discloses only two processors, each of which, therefore, must correspond to the claimed data-networking and cable-modem engines. However, the discussion of Figure 2 makes clear that the cable modem functions are performed by CMAC unit 224 (*see, e.g.,* paragraph 0042). Therefore, in order for the cable modem engine to contain a processor and perform the CMAC functions as claimed, the cited cable modem engine must include circuitry to connect the processors with the CMAC unit. Because available connecting circuitry would be shared with the other processor, Applicant is uncertain how the asserted cable modem engine and home networking engine can be completely

App. Serial No. 10/675,566
 Docket No.: 81373818US01

partitioned as claimed. Because the Office Action has not identified these claimed aspects in the ‘600 reference, a *prima facie* case has not been presented and Applicant requests that the rejection of claims 1-16 be withdrawn.

Applicant submits that the Examiner’s failure to identify corresponding elements as requested in Applicant’s response constitutes an incomplete answer under M.P.E.P. § 707.07 and, therefore, makes the finality of the Office Action improper. In order to comply with 35 U.S.C. § 132, sufficient detail must be provided by the Examiner regarding the alleged correspondence between the claimed invention and the cited reference to enable Applicant to adequately respond to the rejections. *See, also*, 37 CFR 1.104 (“The pertinence of each reference, if not apparent, must be clearly explained and each rejected claim specified.”) and M.P.E.P. § 706.02(j), (“It is important for an Examiner to properly communicate the basis for a rejection so that the issues can be identified early and the applicant can be given fair opportunity to reply.”). Because the Examiner has repeatedly failed to identify specific elements of the ‘600 reference which provide correspondence (as requested in the previous response), Applicant submits that the Office Action is unresponsive to Applicant’s arguments and Applicant requests the finality of the Office Action be withdrawn.

Applicant respectfully traverses the § 112(1) rejection of claim 12 because aspects of the claim directed to a RISC processor are fully supported by Applicant’s specification in compliance with the written description requirement. As shown in Figure 1 and related discussion at paragraph 0028 of Applicant’s published specification, “the functions of the cable modem and data networking are rationally distributed among three different processors: DOCSIS MAC processor 114 (ARM #2); DOCSIS controller 116 (ARM #1); and data networking engine 120 (ARM #3).” Applicant submits that ARM, as commonly used in the art, refers to the Advanced RISC Machine (ARM). ARM is a 32-bit reduced instruction set computer (RISC) instruction set architecture developed by ARM Holding. Applicant submits that word-for-word correspondence is not required by the M.P.E.P. or relevant law, and maintains that the figures, together with the aforementioned discussion in the specification, fully support the claim limitations. *See, e.g., Union Oil Co. of California v. Atlantic Richfield Co.*, 208 F.3d 989 (Fed. Cir. 2000), *cert. denied*, 69 U.S.L.W. 3165 (Feb. 20, 2001) (No. 00-249) (quoting *In re Gosteli*, 872

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Docket No.: 81373818US01

F.2d 1008, 1012, 10 U.S.P.Q.2d 1614, 1618 (Fed. Cir. 1989) (“The written description requirement does not require the applicant “to describe exactly the subject matter claimed, [instead] the description must clearly allow persons of ordinary skill in the art to recognize that [he or she] invented what is claimed. ”). Accordingly the 112(1) rejection is improper and should be withdrawn.


Applicant respectfully traverses the § 112(2) rejection of claims 12-14. While the Office Action erroneously suggests that “substantially” must be defined in the specification. Consistent with § 112(2), Applicant submits that, as used, the phrase “substantially all” would be understood by one of ordinary skill in the art in light of the specification and in the context of decoupling performance of data networking and home networking applications from the implementation of the MAC and VoIP functionality. *See, Andrew Corp. v. Gabriel Electronics*, 847 F.2d 819 (Fed. Cir. 1988). Accordingly, the §112(2) rejection of claims 12-14 fails. Notwithstanding the above, Applicant has amended the claims for clarity and to better reflect the original intent of the claims. The §112(2) rejection is believe to no longer apply.

In view of the above, Applicant believes that each of the rejections is improper and should be withdrawn and that the application is in condition for allowance. Should there be any remaining issues that could be readily addressed over the telephone, the Examiner is asked to contact the agent overseeing the application file, Peter Zawilski, of NXP Corporation at (408) 474-9063 (or the undersigned).

Please direct all correspondence to:

Corporate Patent Counsel
NXP Intellectual Property & Standards
1109 McKay Drive; Mail Stop SJ41
San Jose, CA 95131

CUSTOMER NO. 65913

By: 
Name: Robert J. Crawford
Reg. No.: 32,122
651-686-6633
(NXPS.615PA)

Electronic Acknowledgement Receipt

| | |
|---|--|
| EFS ID: | 7353649 |
| Application Number: | 10675566 |
| International Application Number: | |
| Confirmation Number: | 9980 |
| Title of Invention: | Architecture for a flexible and high-performance gateway cable modem |
| First Named Inventor/Applicant Name: | Gordon Y. Li |
| Customer Number: | 65913 |
| Filer: | Robert J. Crawford/Kelly Davis |
| Filer Authorized By: | Robert J. Crawford |
| Attorney Docket Number: | 81373818US01-02CXT0070D |
| Receipt Date: | 05-APR-2010 |
| Filing Date: | 30-SEP-2003 |
| Time Stamp: | 17:28:10 |
| Application Type: | Utility under 35 USC 111(a) |

Payment information:

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|------------------------|----|
| Submitted with Payment | no |
|------------------------|----|

File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|-----------------|----------------------|---------------------------|--|------------------|------------------|
| 1 | | 81373818US01_response.pdf | 379587 3fd06cee436ac96c2743e668df9e17153ed69a54 | yes | 8 |

Multipart Description/PDF files in .zip description

| | Document Description | Start | End |
|--|--|-------|-----|
| | Amendment After Final | 1 | 1 |
| | Claims | 2 | 5 |
| | Applicant Arguments/Remarks Made in an Amendment | 6 | 8 |

Warnings:

Information:

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| Total Files Size (in bytes): | 379587 |
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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Attorney Docket No.: 348162-982350

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: G. Li

Serial No: 10/675,566

Filed: September 30, 2003

Title: Architecture For A Flexible And High-Performance Gateway Cable Modem

Docket No.: 348162-982350

Customer No.: 94518

| | |
|--|-----------------------|
| <i>Certificate of Transmission Under 37 CFR 1.8</i> | |
| <i>I hereby certify that this correspondence is being transmitted via electronic submission, Commissioner for Patents, Alexandria, VA 22313-1450 on:</i> | |
| <u>April 5, 2010</u> | <u>/Susan Pingue/</u> |
| <i>Date</i> | <i>Susan Pingue</i> |

COMMUNICATION

Assistant Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

Sir:

Attached herewith are copies of the Power of Attorney Form (SB/80) and Statement Under 37 CFR 3.73(b) (SB/96) signed by David L. Teichmann, Secretary and Director of Trident Microsystems (Far East) Ltd. in connection with the above-referenced US patent application.

Please note that the new Attorney Docket Number is 348162-982350.

The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. 07-1896 referencing our Docket No. 348162-982350.

Respectfully submitted,

DLA PIPER LLP US

Dated: April 5, 2010

By /David L. Alberti/
David L. Alberti
Reg. No. 43,465
Attorney for Applicants

DLA Piper LLP US
2000 University Avenue
East Palo Alto, CA 94303
Telephone: (650) 833-2052
Facsimile : (650) 833-2001

CUSTOMER NO. 94518

/SCP

PTO/SB/05 (07-09)

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STATEMENT UNDER 37 CFR 3.73(b)Applicant/Patent Owner: NXPApplication No./Patent No.: 10/675,566 Filed/Issue Date: Sep. 30, 2003

Entitled:

Trident Microsystems (Far East) Ltd. a Corporation
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;
2. ☐ an assignee of less than the entire right, title and interest in
(The extent (by percentage) of its ownership interest is _____ %); or
3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

In the patent application/patent identified above by virtue of either:

- A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 023928, Frame 0552, or for which a copy thereof is attached.

OR

- B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

- ☐ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

Signature

David L. Teichmann,
Printed or Typed Name

Date

Feb. 19, 2010
Secretary and Director
Trident Microsystems
(Far East) Ltd.
Title

PTO/SB/80 (11-08)

Approved for use through 11/30/2011. OMB 0851-0036

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:



Practitioners associated with the Customer Number:

94518

OR



Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

| Name | Registration Number | Name | Registration Number |
|------|---------------------|------|---------------------|
| | | | |
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| | | | |

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:



The address associated with Customer Number:

94518

OR

| | | | |
|--|-------|-----|-------|
| <input type="checkbox"/> Firm or Individual Name | | | |
| Address | | | |
| City | State | Zip | |
| Country | | | |
| Telephone | | | Email |

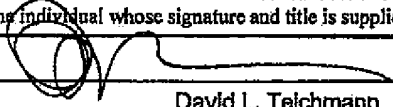
Assignee Name and Address:

Trident Microsystems (Far East) Ltd.
Ugland House, South Church Street
Grand Cayman, Cayman Islands

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/86 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

| | | | |
|-----------|---|-----------|---------------|
| Signature |  | Date | Feb. 19, 2010 |
| Name | David L. Teichmann | Telephone | 408/764-8808 |
| Title | Secretary and Director, Trident Microsystems (Far East) Ltd. | | |

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1480, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Acknowledgement Receipt

| | |
|---|--|
| EFS ID: | 7356207 |
| Application Number: | 10675566 |
| International Application Number: | |
| Confirmation Number: | 9980 |
| Title of Invention: | Architecture for a flexible and high-performance gateway cable modem |
| First Named Inventor/Applicant Name: | Gordon Y. Li |
| Customer Number: | 65913 |
| Filer: | David L. Alberti/Susan Pingue |
| Filer Authorized By: | David L. Alberti |
| Attorney Docket Number: | 81373818US01-02CXT0070D |
| Receipt Date: | 06-APR-2010 |
| Filing Date: | 30-SEP-2003 |
| Time Stamp: | 00:58:42 |
| Application Type: | Utility under 35 USC 111(a) |

Payment information:

| | |
|------------------------|----|
| Submitted with Payment | no |
|------------------------|----|

File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|-----------------|----------------------|---------------------|--|------------------|------------------|
| 1 | | 982350Documents.pdf | 110392 15c4e60163b42cc7843deb01c0d9d2c2f38c78ed | yes | 4 |

Multipart Description/PDF files in .zip description

| | Document Description | Start | End |
|--|---|-------|-----|
| | Miscellaneous Incoming Letter | 1 | 2 |
| | Assignee showing of ownership per 37 CFR 3.73(b). | 3 | 3 |
| | Power of Attorney | 4 | 4 |
| | | | |

Warnings:**Information:****Total Files Size (in bytes):**

110392

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (07-06)

Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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| PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875 | | | | | Application or Docket Number 10/675,566 | | Filing Date 09/30/2003 | | <input type="checkbox"/> To be Mailed | | |
|---|--|----------------------------------|------------|------------------------------------|---|---------------------------------------|----------------------------------|----|---------------------------------------|-------------------------|---|
| APPLICATION AS FILED – PART I | | | | | | | | | | | |
| (Column 1) | | | (Column 2) | | | SMALL ENTITY <input type="checkbox"/> | | OR | | OTHER THAN SMALL ENTITY | |
| FOR | NUMBER FILED | NUMBER EXTRA | RATE (\$) | FEE (\$) | | RATE (\$) | FEE (\$) | | | | |
| <input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c)) | N/A | N/A | N/A | | | N/A | | | | | |
| <input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m)) | N/A | N/A | N/A | | | N/A | | | | | |
| <input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | N/A | N/A | N/A | | | N/A | | | | | |
| TOTAL CLAIMS (37 CFR 1.16(i)) | minus 20 = | * | X \$ | = | | X \$ | = | | | | |
| INDEPENDENT CLAIMS (37 CFR 1.16(h)) | minus 3 = | * | X \$ | = | | X \$ | = | | | | |
| <input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s)) <div style="font-size: small;">If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).</div> | | | | | OR | | | | | | |
| | | | | | | | | | | | |
| <input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | | | | | | | | | | |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | | | TOTAL | | | | | |
| APPLICATION AS AMENDED – PART II | | | | | | | | | | | |
| (Column 1) | | | (Column 2) | | | SMALL ENTITY | | OR | | OTHER THAN SMALL ENTITY | |
| AMENDMENT | 04/05/2010 | CLAIMS REMAINING AFTER AMENDMENT | | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | RATE (\$) | ADDITIONAL FEE (\$) | | RATE (\$) | ADDITIONAL FEE (\$) | |
| | Total (37 CFR 1.16(i)) | * 16 | Minus | ** 20 | = 0 | X \$ | = | | X \$52= | 0 | |
| | Independent (37 CFR 1.16(h)) | * 2 | Minus | ***3 | = 0 | X \$ | = | | X \$220= | 0 | |
| | <input type="checkbox"/> Application Size Fee (37 CFR 1.16(s)) | | | | | | | | | | |
| | <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | | | | | |
| | | | | | | TOTAL ADD'L FEE | | | OR | TOTAL ADD'L FEE | 0 |
| AMENDMENT | | CLAIMS REMAINING AFTER AMENDMENT | | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | RATE (\$) | ADDITIONAL FEE (\$) | | RATE (\$) | ADDITIONAL FEE (\$) | |
| | Total (37 CFR 1.16(i)) | * | Minus | ** | = | X \$ | = | | X \$ | = | |
| | Independent (37 CFR 1.16(h)) | * | Minus | *** | = | X \$ | = | | X \$ | = | |
| | <input type="checkbox"/> Application Size Fee (37 CFR 1.16(s)) | | | | | | | | | | |
| | <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | | | | | |
| | | | | | | TOTAL ADD'L FEE | | | OR | TOTAL ADD'L FEE | |
| * If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1. | | | | | | | | | | | |

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PTO/SB/06 (07-06)

Approved for use through 1/31/2007. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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| PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875 | | | | | Application or Docket Number 10/675,566 | | Filing Date 09/30/2003 | | <input type="checkbox"/> To be Mailed | | |
|--|--|----------------------------------|-----------|---------------------------------------|---|--------------|----------------------------------|-------------------------|---------------------------------------|-------------------------|----------|
| APPLICATION AS FILED – PART I | | | | | | | | | | | |
| (Column 1) | | (Column 2) | | SMALL ENTITY <input type="checkbox"/> | | OR | | OTHER THAN SMALL ENTITY | | | |
| FOR | NUMBER FILED | NUMBER EXTRA | RATE (\$) | FEE (\$) | RATE (\$) | FEE (\$) | | | | | |
| <input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c)) | N/A | N/A | N/A | | N/A | | | | | | |
| <input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m)) | N/A | N/A | N/A | | N/A | | | | | | |
| <input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | N/A | N/A | N/A | | N/A | | | | | | |
| TOTAL CLAIMS (37 CFR 1.16(i)) | minus 20 = | * | X \$ | = | OR | X \$ | = | | | | |
| INDEPENDENT CLAIMS (37 CFR 1.16(h)) | minus 3 = | * | X \$ | = | | X \$ | = | | | | |
| <input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s)) <div style="font-size: small;">If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).</div> | | | | | | | | | | | |
| | | | | | | | | | | | |
| <input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | | | | | | | | | | |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | | TOTAL | | | | | | |
| APPLICATION AS AMENDED – PART II | | | | | | | | | | | |
| (Column 1) | | (Column 2) | | (Column 3) | | SMALL ENTITY | | OR | | OTHER THAN SMALL ENTITY | |
| AMENDMENT | 04/05/2010 | CLAIMS REMAINING AFTER AMENDMENT | | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | RATE (\$) | ADDITIONAL FEE (\$) | RATE (\$) | ADDITIONAL FEE (\$) | | |
| | Total (37 CFR 1.16(i)) | * 16 | Minus | ** 20 | = 0 | X \$ | = | OR | X \$52= | 0 | |
| | Independent (37 CFR 1.16(h)) | * 2 | Minus | *** 3 | = 0 | X \$ | = | OR | X \$220= | 0 | |
| | <input type="checkbox"/> Application Size Fee (37 CFR 1.16(s)) | | | | | | | | | | |
| | <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | | | | | |
| | | | | | TOTAL ADD'L FEE | | OR | | TOTAL ADD'L FEE | | 0 |
| (Column 1) | | (Column 2) | | (Column 3) | | SMALL ENTITY | | OR | | OTHER THAN SMALL ENTITY | |
| AMENDMENT | | CLAIMS REMAINING AFTER AMENDMENT | | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | RATE (\$) | ADDITIONAL FEE (\$) | RATE (\$) | ADDITIONAL FEE (\$) | | |
| | Total (37 CFR 1.16(i)) | * | Minus | ** | = | X \$ | = | OR | X \$ | = | |
| | Independent (37 CFR 1.16(h)) | * | Minus | *** | = | X \$ | = | OR | X \$ | = | |
| | <input type="checkbox"/> Application Size Fee (37 CFR 1.16(s)) | | | | | | | | | | |
| | <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | | | | | |
| | | | | | TOTAL ADD'L FEE | | OR | | TOTAL ADD'L FEE | | |
| <p>* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.</p> <p>** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".</p> <p>*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".</p> <p>The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.</p> | | | | | | | | | | | |

Legal Instrument Examiner:
/VIOLA ROGERS/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|------------------------------|------------------|
| 10/675,566 | 09/30/2003 | Gordon Y. Li | 81373818US01-02CXT0070D | 9980 |
| 94518 | 7590 | 05/11/2010 | | |
| DLA PIPER LLP (US) 2000 UNIVERSITY AVENUE EAST PALO ALTO, CA 94303 | | | EXAMINER HOSSAIN, TANIM M | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2445 | |
| | | | MAIL DATE | DELIVERY MODE |
| | | | 05/11/2010 | PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

**Advisory Action
Before the Filing of an Appeal Brief**

Application No.

10/675,566

Applicant(s)

LI ET AL.

Examiner

Tanim Hossain

Art Unit

2445

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 05 April 2010 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

1. ☒ The reply was filed after a final rejection, but prior to or on the same day as filing a Notice of Appeal. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. The reply must be filed within one of the following time periods:

- a) ☐ The period for reply expires _____ months from the mailing date of the final rejection.
b) ☒ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.

Examiner Note: If box 1 is checked, check either box (a) or (b). ONLY CHECK BOX (b) WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☐ The proposed amendment(s) filed after a final rejection, but prior to the date of filing a brief, will not be entered because
(a) ☐ They raise new issues that would require further consideration and/or search (see NOTE below);
(b) ☐ They raise the issue of new matter (see NOTE below);
(c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
(d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: _____. (See 37 CFR 1.116 and 41.33(a)).

4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicant's reply has overcome the following rejection(s): _____.
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☒ For purposes of appeal, the proposed amendment(s): a) ☐ will not be entered, or b) ☒ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.
The status of the claim(s) is (or will be) as follows:
Claim(s) allowed: _____.
Claim(s) objected to: _____.
Claim(s) rejected: 1-16.
Claim(s) withdrawn from consideration: _____.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ The affidavit or other evidence filed after a final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
9. ☐ The affidavit or other evidence filed after the date of filing a Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of a good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
10. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

11. ☒ The request for reconsideration has been considered but does NOT place the application in condition for allowance because:
See Continuation Sheet.
12. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____
13. ☐ Other: _____.

/VIVEK SRIVASTAVA/
Supervisory Patent Examiner, Art Unit 2445

Continuation of 11. does NOT place the application in condition for allowance because: Brooks' abstract, for example, discloses bifurcated processing architecture. The first processor processes information flowing to and from cable media interface circuitry. This constitutes the data networking engine, which performs the interacting with equipment, as claimed. The second processor performs the management of some message processing and scheduling, which constitutes cable modem functions other than those of the data networking engine (please see paragraph 0026). This then constitutes the cable modem engine, as claimed. Claim 9 of the Brooks reference further teaches partitioned processors, where the co-processor supports the processing of cable media and performs data transfer, and the first processor performs a plurality of other processing functions.

The 112 rejections are hereby withdrawn.

Finality of the previous office action is proper, given that the cited paragraphs point to the bifurcated nature of the cable modem, where each of the processors perform different functions. This is sufficient to equate the corresponding processor to the data networking engine (the processor that handles the data flow), and the other to the cable modem engine (the processor that performs other functions).

Reply under 37 C.F.R. 1.116
Expedited Procedure
Technology Center 2445

Confirmation No. 9980

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

| | | | |
|-------------|---|-----------------|------------------------------|
| Applicant: | LI <i>et al.</i> | Examiner: | Hossain, Tanim |
| Serial No.: | 10/675,566 | Group Art Unit: | 2445 |
| Filed: | September 30, 2003 | Docket No.: | 81373818US01 (NXPS.615PA) |
| Title: | ARCHITECTURE FOR A FLEXIBLE AND HIGH-PERFORMANCE GATEWAY CABLE MODEM | | |

**REQUEST TO WITHDRAW FINALITY AND
RESPONSE TO FINAL OFFICE ACTION**

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Commissioner for Patents
P.O. Box 1450
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| |
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| Customer No. 65913 |
|------------------------------|

Okay to enter amendments.
Thanks, TH

Dear Sir:

In acknowledgement of the Final Office Action dated February 5, 2010, please reconsider the application in view of the following amendments and remarks.

A complete listing of the claims, including any amendments, and Remarks/Arguments follow.

Authorization is given to charge/credit **Deposit Account 50-4019 (81373818US01)** all required fees/overages to enter this paper.

PTO/SB/30 (09-08)

Approved for use through 10/31/2008, OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Request for Continued Examination (RCE) Transmittal

Address to:
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| | |
|------------------------|------------------------------|
| Application Number | 10/675,566 |
| Filing Date | September 30, 2003 |
| First Named Inventor | Gordon Y. Li |
| Art Unit | 2445 |
| Examiner Name | Tanim M. Hossain |
| Attorney Docket Number | 348162-982350 [81373818US01] |

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. See Instruction Sheet for RCEs (not to be submitted to the USPTO) on page 2.

1. **Submission required under 37 CFR 1.114** Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

a. ☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

i. ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

ii. ☐ Other _____

b. ☒ Enclosed

i. ☒ Amendment/Reply

iii. ☐ Information Disclosure Statement (IDS)

ii. ☐ Affidavit(s)/ Declaration(s)

iv. ☐ Other _____

2. Miscellaneous

a. ☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of _____ months. (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

b. ☐ Other _____

3. Fees

The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.

a. ☒ The Director is hereby authorized to charge the following fees, any underpayment of fees, or credit any overpayments, to Deposit Account No. 07-1896.

i. ☒ RCE fee required under 37 CFR 1.17(e)

ii. ☒ Extension of time fee (37 CFR 1.136 and 1.17)

iii. ☐ Other _____

b. ☐ Check in the amount of \$ _____ enclosed

c. ☐ Payment by credit card (Form PTO-2038 enclosed)

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

| | | | |
|-------------------|----------------------|------------------|--------------|
| Signature | /Gerald T. Sekimura/ | Date | June 7, 2010 |
| Name (Print/Type) | Gerald T. Sekimura | Registration No. | 30,103 |

CERTIFICATE OF MAILING OR ELECTRONIC TRANSMISSION

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop RCE, Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450 or electronically transmitted to the U.S. Patent and Trademark Office on the date shown below.

| | |
|-------------------|-----------------------|
| Signature | /Ta-Tanisha L. Henry/ |
| Name (Print/Type) | Ta-Tanisha L. Henry |
| Date | June 7, 2010 |

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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| | | | |
|--------------|------------------------|------------------|------|
| Appl. No. | : 10/675,566 | Confirmation No. | 9980 |
| Applicants | : Gordon Y. Li, et al. | | |
| Filed | : September 30, 2003 | | |
| TC/A.U. | : 2445 | | |
| Examiner | : Tanim M. Hossain | | |
| Docket No. | : 348162-982350 | | |
| | [81373818US01] | | |
| Customer No. | : 94518 | | |

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AMENDMENT

Sir:

In connection with the Request for Continued Examination, filed herewith,
please amend the subject application as follows:

Any Amendments to the Claims are reflected in the listing of claims
which begins on page 2 of this paper.

Remarks/Arguments begin on page 6 of this paper.

Appl. No. 10/675,566
Amendment in connection with RCE
348162-982350

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) A cable modem system comprising:

a data networking engine implemented in a first circuit that includes at least one processor, the data networking engine programmed with software that when executed by the at least one processor of the first circuit causes the data networking engine to perform home networking functions including interfacing with customer provided equipment;

a cable modem engine implemented in a second circuit that includes at least one processor, the second circuit being separate from the first circuit, the cable modem engine programmed with software that when executed by the at least one processor of the second circuit causes the cable modem engine to perform cable modem functions other than the home networking functions performed by the data networking engine, the cable modem functions including interfacing with cable media, and the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine; and

a data bus that connects the data networking engine to the cable modem engine,

wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine.

2. (Original) A cable modem system as claimed in claim 1, wherein all DOCSIS functions are localized in the cable modem engine.

Appl. No. 10/675,566
Amendment in connection with RCE
348162-982350

3. (Original) A cable modem system as claimed in claim 2, wherein VoIP functionality is embedded in the cable modem engine.

4. (Previously presented) A cable modem system as claimed in claim 1, and further comprising an advanced crypto engine configured to perform all crypto functions for both the data networking engine and the cable modem engine, the advanced crypto engine being separate from both the data networking engine and the cable modem engine.

5. (Previously presented) A cable modem system as claimed in claim 1, wherein the cable modem engine includes:

- a DOCSIS PHY layer;
- a DOCSIS MAC processor; and
- a DOCSIS controller, and

wherein the at least one processor of the data networking engine is a RISC processor.

6. (Previously presented) A cable modem system as claimed in claim 5, wherein the DOCSIS PHY layer includes a hardware transmitter and receiver.

7. (Previously presented) A cable modem system as claimed in claim 5, wherein the DOCSIS MAC processor is configured to process downstream PDU packets and forward the processed packets directly to the data networking engine without the involvement of the DOCSIS controller in order to boost downstream throughput.

8. (Original) A cable modem system as claimed in claim 5, wherein all VoIP functionality is implemented in the DOCSIS controller.

9. (Original) A cable modem system as claimed in claim 8, wherein the VoIP functionality is in conformance with the PacketCable specification.

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10. (Previously presented) A cable modem system as claimed in claim 5, wherein the data networking engine is configured to perform all data networking processing including advanced multi-port bridging routing with NAT/firewall and VPN, and home networking applications.

11. (Original) A cable modem system as claimed in claim 10, wherein the data networking engine comprises the entire embedded portal services functionality of the CableHome specification.

12. (Previously presented) A cable modem system as claimed in claim 5, wherein the cable modem engine includes:

- the DOCSIS PHY layer includes a transmitter and receiver;
- the DOCSIS MAC processor is configured to implement real-time MAC functions for both upstream and downstream communications; and
- the DOCSIS controller is configured to implement VoIP functionality; and wherein

- the data networking engine includes a RISC processor configured to implement a majority of data networking processing and home networking applications decoupled from the implementation of the MAC functions and the VoIP functionality of the cable modem engine.

13. (Previously presented) A cable modem architecture as claimed in claim 12, wherein the DOCSIS controller is configured to provide VoIP functionality in accordance with the PacketCable specification, wherein the data networking engine is configured to provide the embedded portal services functionality of the CableHome specification, and wherein the CableHome functionality provided by the data networking engine is completely decoupled from the PacketCable and DOCSIS functionality provided by the cable modem engine.

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348162-982350

14. (Original) A cable modem architecture as claimed in claim 13, wherein the DOCSIS MAC processor is an ARM9TDMI-based RISC processor, and wherein the DOCSIS controller is an ARM940-based RISC processor.

15. (Original) A method for providing a flexible and partitioned cable modem gateway comprising: providing data and home networking functionality in a data networking engine; providing DOCSIS and VoIP functionality in a cable modem engine; and partitioning the data networking engine from the cable modem engine so that the data and home networking functionality is completely decoupled from the DOCSIS and VoIP functionality.

16. (Previously presented) A cable modem system as claimed in claim 5, wherein the data networking engine includes consumer provided equipment drivers including a USB driver and an Ethernet driver and the data networking engine is configured to provide the embedded portal services functionality of the CableHome specification, wherein the DOCSIS controller is configured to provide VoIP functionality in accordance with the PacketCable specification, and wherein the CableHome functionality provided by the data networking engine is completely decoupled from the PacketCable and DOCSIS functionality provided by the cable modem engine.

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Amendment in connection with RCE
348162-982350

REMARKS/ARGUMENTS

Reconsideration of the subject application, as amended, is respectfully requested.

Claims 1-16 are pending in the subject application. Claim 1 has been amended to recite that the cable modem functions include interfacing with cable media. Support for this amendment is found in the implementation examples of Figures 1 and 2, and the illustrated interfaces to the HFC or RF external sources.

In the February 5, 2010 Office Action, made final, the Examiner rejected claims 1-16 under 35 USC 102(e) as being anticipated by Brooks (U.S. 2001/0039600) ("Brooks '600"). (See, Office Action, p. 3.) Claim 12 was rejected under 35 USC 112, first paragraph, as failing to comply with the written description. Claims 12-14 were rejected under 35 USC 112, second paragraph, as indefinite.

A Request to Withdraw Finality and Response to Final Office Action was filed on April 5, 2010 in which claims 1 and 12 were amended to address the Examiner's section 112 rejections, and it was pointed out that there was continued uncertainty as to how the Examiner was interpreting and applying the disclosures of Brooks '600 to the claims at issue. More specifically, it was pointed out that in Brooks '600, only two processors were disclosed. Therefore, from the Examiner's position that "the data networking engine and cable modem engines are represented in figures 1 and 2" (Office Action, p. 8), it would follow that one of the two processors corresponded to the networking engine, and the other of the two processors corresponded to the cable modem engine. It was further pointed out that while the discussion concerning Figure 2 in Brooks '600 paragraph 0042 makes clear that cable modem functions are performed by CMAC unit 224, if the cable modem engine is to contain a processor and perform CMAC functions as claimed, the cited cable modem engine must include circuitry

Appl. No. 10/675,566
 Amendment in connection with RCE
 348162-982350

to connect one of the processors with the CMAC unit. It was noted, however, that because available connecting circuitry would be shared by both the one processor and the other processor, the asserted cable modem engine and home networking engine could not be completely partitioned as claimed.

In the Examiner's Advisory Action (notification date May 11, 2010) the Examiner withdrew the section 112 rejections, continued the finality of the 102(e) rejection, and provided a limited further explanation of his view of how the disclosure of Brooks '600 applies to the pending claims. However, despite this further explanation, it is still not clear as to what the Examiner considers to be the cable modem engine and the data networking engine in Brooks '600.

The Examiner explained that:

Brooks' abstract, for example, discloses bifurcated processing architecture. The first processor processes information flowing to and from cable media interface circuitry. This constitutes the data networking engine, which performs the interacting with equipment, as claimed. The second processor performs the management of some message processing and scheduling, which constitutes cable modem functions other than those of the data networking engine (please see paragraph 0026). This the constitutes the cable modem engine, as claimed. Claim 9 of the Brooks reference further teaches partitioned processors, where the co-processor supports the processing of cable media and performs data transfer, and the first processor performs a plurality of other processing functions.

(Advisory Action Before Filing of an Appeal Brief, sheet 3.)

First of all, the Examiner's assertion that "[t]his constitutes the data networking engine, which performs the interacting with equipment, as claimed" appears to equate the "cable media interface circuitry" with the "customer provided equipment" of, for example, claim 1. Presumably, the Examiner is referring to the CMAC/CPHY block (114, 118, 224 and 228) of Fig. 2 as the cable media interface circuitry. However, Brooks '600 does not describe such blocks as customer provided equipment. Thus, it is not clear what the Examiner considers to correspond to "customer provided equipment" in Brooks '600.

Appl. No. 10/675,566
Amendment in connection with RCE
348162-982350

Further, from the above explanation, it appears that the Examiner may be asserting that the cable modem engine includes second processor 104, that the data networking engine is first processor 102 (see Fig. 2), and that the CMAC/CPHY block (114, 118, 224 and 228) is also a part of the cable modem engine. However, processor 102 handles many cable modem functions (see Fig. 4, paragraphs 0053 to 0062), and is explicitly described as “programmed to implement the desired MAC functionality” (paragraph 0026). Paragraph 0025 states “[i]n the case of DOCSIS, typical MAC functionality includes MPEG and MCNS decoding and frame synchronization.” On the other hand, processor 104 is described only as providing operating system support and that it “may manage some message processing and scheduling” (paragraph 0026, emphasis added). Thus, the Examiner’s designation of the first processor as the “data networking engine” is at odds with the Brooks ‘600 description of processor 102 as being “programmed to implement the desired MAC functionality.”

The Examiner’s apparent designation of the first processor 102 in Brooks ‘600 as the “data networking engine,” and the second processor 104 and the CMAC/CPHY block (114, 118, 224 and 228) as the “cable modem engine,” further does not square with the claim 1 feature that “the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine,” and the claim 15 feature of “partitioning the data networking engine from the cable modem engine so that the data and home networking functionality is completely decoupled from the DOCSIS and VOIP functionality.” This is because the CMAC/CPHY block (114, 118, 224 and 228) communicates with both the processors 102 and 104 by sharing the same data paths and sharing the same direct memory access controller. (See peripheral bus 112 – bridge 110 – system bus 108 in Fig. 1 and APB 214 – DMA Controller/ASB-APB Bridge 212 – ASB 210 in Fig. 2, and paragraphs 0034 and 0035).

Appl. No. 10/675,566
Amendment in connection with RCE
348162-982350

Further, accepting the Examiner's assertion that first processor 102 handles data networking functionality, and considering the description of paragraphs 0025 and 0026 that processor 102 is programmed to implement the desired MAC functionality (which would include typical DOCSIS MAC functionality), leads to a conclusion that the Brooks '600 processor 102 does not implement a complete partitioning or a completely decoupled arrangement of the data networking engine from the cable modem engine.

Thus, Brooks '600 does not provide the complete partitioning or completely decoupled arrangement of the data networking engine from the cable modem engine that the Examiner apparently asserts it does.

For at least the above reasons, it is respectfully submitted that Brooks '600 does not teach or make obvious the claimed subject matter.

The Examiner also asserts that claim 9 of the Brooks reference:

further teaches partitioned processors, where the co-processor supports the processing of cable media and performs data transfer, and the first processor performs a plurality of other processing functions.

(Advisory Action Before Filing of an Appeal Brief, sheet 3.)

It is respectfully submitted that the description that the "co-processor supports the processing of cable media and performs data transfer" (emphasis added) indicates that there is no partitioning of cable modem functionality from data networking functionality in the co-processor, but instead a combining of the same. Thus, claim 9 of Brooks '600 does not support the Examiner's rejection of the claims of the subject application.

In view of the above, it is respectfully submitted that the application is now in condition for allowance. The Examiner's reconsideration and further examination are respectfully requested.

Appl. No. 10/675,566
Amendment in connection with RCE
348162-982350

The undersigned attorney would welcome an opportunity to discuss the claims as amended and Brooks '600 with the Examiner in order to better understand the Examiner's interpretation of the same, and to advance the subject application toward allowance.

Respectfully submitted,

DLA Piper LLP (US)

Dated: June 7, 2010

By: /Gerald T. Sekimura/
Gerald T. Sekimura
Reg. No. 30,103
Tel.: (415) 836-2500

Attn.: Patent Department
DLA Piper LLP (US)
555 Mission Street, Suite 2400
San Francisco, CA 94105-2933

PTO/SB/22 (07-09)

Approved for use through 07/31/2012. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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| PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a) | | Docket Number (Optional) | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|------------|------------------------------|-----------|--|------------|-------------------------|--|---|-------|------|-----------|---|-------|-------|----------|---|--------|-------|----------|--|--------|-------|----------|--|--------|--------|----------|
| FY 2009 | | 348162-982350 [81373818US01] | | | | | | | | | | | | | | | | | | | | | | | | | |
| <i>(Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).)</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Application Number 10/675,566 | | Filed September 30, 2003 | | | | | | | | | | | | | | | | | | | | | | | | | |
| For Architecture for a Flexible and High-Performance Gateway Cable Modem | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Art Unit 2445 | | Examiner Tanim M. Hossain | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.</p> <p>The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;"></th> <th style="width: 15%; text-align: center;"><u>Fee</u></th> <th style="width: 15%; text-align: center;"><u>Small Entity Fee</u></th> <th style="width: 30%;"></th> </tr> </thead> <tbody> <tr> <td><input checked="" type="checkbox"/> One month (37 CFR 1.17(a)(1))</td> <td style="text-align: center;">\$130</td> <td style="text-align: center;">\$65</td> <td style="text-align: right;">\$ 130.00</td> </tr> <tr> <td><input type="checkbox"/> Two months (37 CFR 1.17(a)(2))</td> <td style="text-align: center;">\$490</td> <td style="text-align: center;">\$245</td> <td style="text-align: right;">\$ _____</td> </tr> <tr> <td><input type="checkbox"/> Three months (37 CFR 1.17(a)(3))</td> <td style="text-align: center;">\$1110</td> <td style="text-align: center;">\$555</td> <td style="text-align: right;">\$ _____</td> </tr> <tr> <td><input type="checkbox"/> Four months (37 CFR 1.17(a)(4))</td> <td style="text-align: center;">\$1730</td> <td style="text-align: center;">\$865</td> <td style="text-align: right;">\$ _____</td> </tr> <tr> <td><input type="checkbox"/> Five months (37 CFR 1.17(a)(5))</td> <td style="text-align: center;">\$2350</td> <td style="text-align: center;">\$1175</td> <td style="text-align: right;">\$ _____</td> </tr> </tbody> </table> <p><input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27.</p> <p><input type="checkbox"/> A check in the amount of the fee is enclosed.</p> <p><input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached.</p> <p><input type="checkbox"/> The Director has already been authorized to charge fees in this application to a Deposit Account.</p> <p><input checked="" type="checkbox"/> The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number <u>07-1896</u>.</p> <p>WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.</p> <p>I am the <input type="checkbox"/> applicant/inventor.</p> <p><input type="checkbox"/> assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).</p> <p><input checked="" type="checkbox"/> attorney or agent of record. Registration Number <u>30,103</u></p> <p><input type="checkbox"/> attorney or agent under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34 _____</p> <p><u>/Gerald T. Sekimura/</u> <u>June 7, 2010</u></p> <p style="text-align: center;">Signature Date</p> <p><u>Gerald T. Sekimura</u> <u>(415) 836-2500</u></p> <p style="text-align: center;">Typed or printed name Telephone Number</p> <p>NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.</p> <p><input checked="" type="checkbox"/> Total of <u>1</u> forms are submitted.</p> | | | | | <u>Fee</u> | <u>Small Entity Fee</u> | | <input checked="" type="checkbox"/> One month (37 CFR 1.17(a)(1)) | \$130 | \$65 | \$ 130.00 | <input type="checkbox"/> Two months (37 CFR 1.17(a)(2)) | \$490 | \$245 | \$ _____ | <input type="checkbox"/> Three months (37 CFR 1.17(a)(3)) | \$1110 | \$555 | \$ _____ | <input type="checkbox"/> Four months (37 CFR 1.17(a)(4)) | \$1730 | \$865 | \$ _____ | <input type="checkbox"/> Five months (37 CFR 1.17(a)(5)) | \$2350 | \$1175 | \$ _____ |
| | <u>Fee</u> | <u>Small Entity Fee</u> | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input checked="" type="checkbox"/> One month (37 CFR 1.17(a)(1)) | \$130 | \$65 | \$ 130.00 | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Two months (37 CFR 1.17(a)(2)) | \$490 | \$245 | \$ _____ | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Three months (37 CFR 1.17(a)(3)) | \$1110 | \$555 | \$ _____ | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Four months (37 CFR 1.17(a)(4)) | \$1730 | \$865 | \$ _____ | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> Five months (37 CFR 1.17(a)(5)) | \$2350 | \$1175 | \$ _____ | | | | | | | | | | | | | | | | | | | | | | | | |

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

American LegalNet, Inc.
www.FormsWorkFlow.com

| Electronic Patent Application Fee Transmittal | | | | |
|--|-----------------|--|---------------|-----------------------------|
| Application Number: | | 10675566 | | |
| Filing Date: | | 30-Sep-2003 | | |
| Title of Invention: | | Architecture for a flexible and high-performance gateway cable modem | | |
| First Named Inventor/Applicant Name: | | Gordon Y. Li | | |
| Filer: | | Gerald T. Sekimura./Ta-Tanisha Henry | | |
| Attorney Docket Number: | | 81373818US01-02CXT0070D | | |
| Filed as Large Entity | | | | |
| Utility under 35 USC 111(a) Filing Fees | | | | |
| Description | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
| Basic Filing: | | | | |
| Pages: | | | | |
| Claims: | | | | |
| Miscellaneous-Filing: | | | | |
| Petition: | | | | |
| Patent-Appeals-and-Interference: | | | | |
| Post-Allowance-and-Post-Issuance: | | | | |
| Extension-of-Time: | | | | |
| Extension - 1 month with \$0 paid | 1251 | 1 | 130 | 130 |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
|-----------------------------------|----------|----------|--------|----------------------|
| Miscellaneous: | | | | |
| Request for continued examination | 1801 | 1 | 810 | 810 |
| Total in USD (\$) | | | | 940 |

Electronic Acknowledgement Receipt

| | |
|---|--|
| EFS ID: | 7760990 |
| Application Number: | 10675566 |
| International Application Number: | |
| Confirmation Number: | 9980 |
| Title of Invention: | Architecture for a flexible and high-performance gateway cable modem |
| First Named Inventor/Applicant Name: | Gordon Y. Li |
| Customer Number: | 94518 |
| Filer: | Gerald T. Sekimura./Ta-Tanisha Henry |
| Filer Authorized By: | Gerald T. Sekimura. |
| Attorney Docket Number: | 81373818US01-02CXT0070D |
| Receipt Date: | 07-JUN-2010 |
| Filing Date: | 30-SEP-2003 |
| Time Stamp: | 16:27:16 |
| Application Type: | Utility under 35 USC 111(a) |

Payment information:

| | |
|--|-----------------|
| Submitted with Payment | yes |
| Payment Type | Deposit Account |
| Payment was successfully received in RAM | \$ 940 |
| RAM confirmation Number | 3079 |
| Deposit Account | 071896 |
| Authorized User | |

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|--|--|---------------|--|------------------|------------------|
| 1 | Request for Continued Examination (RCE) | RCE.pdf | 48886 | no | 1 |
| | | | c85fe713393b1f9cd3dc1fcdfa6d70fc5f758569 | | |
| Warnings: | | | | | |
| This is not a USPTO supplied RCE SB30 form. | | | | | |
| Information: | | | | | |
| 2 | Amendment Submitted/Entered with Filing of CPA/RCE | AMDWRCE.pdf | 264973 | no | 10 |
| | | | d3563b1c983ce99c9eb55bee255fa27eb3825d4b | | |
| Warnings: | | | | | |
| Information: | | | | | |
| 3 | Extension of Time | EXTOFTIME.pdf | 39944 | no | 1 |
| | | | 85fc5cbe6b09b83b3da5b23062dedb695b72ca68 | | |
| Warnings: | | | | | |
| Information: | | | | | |
| 4 | Fee Worksheet (PTO-875) | fee-info.pdf | 32070 | no | 2 |
| | | | 86f2919b0938be6416273613089982c4e03262a8 | | |
| Warnings: | | | | | |
| Information: | | | | | |
| Total Files Size (in bytes): | | | 385873 | | |
| <p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p> | | | | | |



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UNITED STATES DEPARTMENT OF COMMERCE
 United States Patent and Trademark Office
 Address: COMMISSIONER FOR PATENTS
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
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| APPLICATION NUMBER | FILING OR 371(C) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|--------------------|-----------------------|-----------------------|-------------------------|
| 10/675,566 | 09/30/2003 | Gordon Y. Li | 81373818US01-02CXT0070D |

CONFIRMATION NO. 9980**POWER OF ATTORNEY NOTICE**

OC000000041004721

65913
 NXP, B.V.
 NXP INTELLECTUAL PROPERTY & LICENSING
 M/S41-SJ
 1109 MCKAY DRIVE
 SAN JOSE, CA 95131

Date Mailed: 06/18/2010

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 04/06/2010.

- The Power of Attorney to you in this application has been revoked by the applicant. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/cdsmith/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



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| APPLICATION NUMBER | FILING OR 371(C) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|--------------------|-----------------------|-----------------------|-------------------------|
| 10/675,566 | 09/30/2003 | Gordon Y. Li | 81373818US01-02CXT0070D |

CONFIRMATION NO. 9980**POA ACCEPTANCE LETTER**

94518

DLA PIPER LLP (US)
 2000 UNIVERSITY AVENUE
 EAST PALO ALTO, CA 94303



Date Mailed: 06/18/2010

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 04/06/2010.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/cdsmith/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



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UNITED STATES DEPARTMENT OF COMMERCE
 United States Patent and Trademark Office
 Address: COMMISSIONER FOR PATENTS
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|-------------------------|------------------|
| 10/675,566 | 09/30/2003 | Gordon Y. Li | 81373818US01-02CXT0070D | 9980 |

94518 7590 09/02/2011
 DLA PIPER LLP (US)
 2000 UNIVERSITY AVENUE
 EAST PALO ALTO, CA 94303

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| EXAMINER |
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WINDER, PATRICE L

| | |
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| ART UNIT | PAPER NUMBER |
|----------|--------------|

2452

| | |
|-----------|---------------|
| MAIL DATE | DELIVERY MODE |
|-----------|---------------|

09/02/2011

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|----------------------------------|--|
| Office Action Summary | Application No. 10/675,566 | Applicant(s) LI ET AL. | |
| | Examiner PATRICE WINDER | Art Unit 2452 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 June 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 5) ☒ Claim(s) 1-16 is/are pending in the application.
- 5a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) ____ is/are allowed.
- 7) ☒ Claim(s) 1-16 is/are rejected.
- 8) ☐ Claim(s) ____ is/are objected to.
- 9) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

Application/Control Number: 10/675,566
Art Unit: 2452

Page 2

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 7, 2010 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 4-6, 10, 11, are rejected under 35 U.S.C. 103(a) as being unpatentable over Schain et al., US 6,944,706 B2 (hereafter referred to Schain).

Regarding claim 1, Schain taught a cable modem system (column 4, lines 12-21) comprising:

a data networking engine implemented in a first circuit that includes at least one processor (processing element), the data networking engine programmed with software that when executed by the at least one processor of the first circuit causes the data

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Art Unit: 2452

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networking engine to perform home networking functions including interfacing with customer provided equipment (column 4, lines 22-28);

a cable modem engine implemented in a second circuit that includes at least one processor, the second circuit being separate from the first circuit (column 10, lines 28-34), the cable modem engine programmed with software that when executed by the at least one processor of the second circuit causes the cable modem engine to perform cable modem functions other than the home networking functions performed by the data networking engine, the cable modem functions including interfacing with cable media (column 4, lines 28-43; column 8, lines 35-48), and the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine (column 10, lines 28-34); and

a data bus that connects the data networking engine to the cable modem engine, wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine (column 9, lines 26-28). Schain does not specifically teach separate processing elements but suggests embodiments where the engines would be implemented in the separate processing elements (column 10, lines 10-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made that incorporating separate processing elements would have been equivalent embodiment.

Regarding dependent claim 2, Schain taught all DOCSIS functions are localized in the cable modem engine (column 8, lines 49-51).

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Regarding dependent claim 4, Schain taught a cable modem system further comprising an advanced crypto engine configured to perform all crypto functions for both the data networking engine and the cable modem engine, the advanced crypto engine being separate from both the data networking engine and the cable modem engine (column 12, lines 55-64).

Regarding dependent claim 5, Schain taught a cable modem engine includes: a DOCSIS PHY layer; a DOCSIS MAC processor; and a DOCSIS controller, and wherein the at least one processor of the data networking engine is a RISC processor (column 13, lines 26-36).

Regarding dependent claim 6, Schain taught DOCSIS PHY layer includes a hardware transmitter and receiver (column 7, lines 47-51).

Regarding dependent claim 10, Schain taught the data networking engine is configured to perform all data networking processing including advanced multi-port bridging routing with NAT/firewall and VPN, and home networking applications (column 11, lines 59-67; column 12, lines 10).

Regarding dependent claim 11, Schain does not specifically teach the data networking engine comprises the entire embedded portal services functionality of the CableHome specification. "Official notice" is taken embedded portal services functionality CableHome specification is well known in the art. It would have been obvious to one of ordinary skill in the art at the time the invention was made that incorporating the CableHome specification in Schain's data networking engine would

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have improved effectiveness. The motivation would have been to provide new services in a standardized manner.

Claims 3, 8, 9, 12-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schain as applied to claims 2, 5 above, and further in view of Winters et al., US 2006/0080650 A1 (hereafter referred to as Winters).

Regarding dependent claim 3, Schain does not specifically teach VoIP functionality is embedded in the cable modem engine. However, Winters taught VoIP functionality is embedded in the cable modem engine (paragraphs 5-6). It would have been obvious to one of ordinary skill in the art at the time the invention was made that incorporating Winter's VoIP functionality in Schain's cable modem would have extended functionality. The motivation would have to expand Schain's functionality to include voice telephony and provide capabilities for other cable modem services.

Regarding dependent claim 8, Schain does not specifically teach all VoIP functionality is implemented in the DOCSIS controller. However, Winters taught VoIP functionality is implemented in the DOCSIS controller of a cable modem (paragraphs 5-6). It would have been obvious to one of ordinary skill in the art at the time the invention was made that incorporating Winter's VoIP functionality in Schain's cable modem would have extended functionality. The motivation would have to expand functionality to include voice telephony and provide capabilities for other cable modem services.

Regarding dependent claim 9, Winters taught the VoIP functionality is in conformance with the PacketCable specification (paragraphs 5-6).

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Regarding dependent claim 12, Schain taught the cable modem engine includes: the DOCSIS PHY layer includes a transmitter and receiver (column 7, lines 47-51); the DOCSIS MAC processor is configured to implement real-time MAC functions for both upstream and downstream communications (column 12, lines 25-38); and the DOCSIS controller is configured to implement other functionality (column 10, lines 54-62); and wherein the data networking engine includes a processing element configured to implement a majority of data networking processing and home networking applications decoupled from the implementation of the MAC functions and the other functionality of the cable modem engine (column 8, lines 35-48). Schain does not specifically teach the other functionality is VoIP functionality. However, Winters taught VoIP functionality is implemented in the DOCSIS controller of a cable modem (paragraphs 5-6). It would have been obvious to one of ordinary skill in the art at the time the invention was made that incorporating Winter's VoIP functionality in Schain's cable modem would have extended functionality. The motivation would have to expand functionality to include voice telephony and provide capabilities for other cable modem services.

Regarding dependent claim 13, Winters taught the DOCSIS controller is configured to provide VoIP functionality in accordance with the PacketCable specification, wherein the data networking engine is configured to provide the embedded portal services functionality of the CableHome specification, and wherein the CableHome functionality provided by the data networking engine is completely

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decoupled from the PacketCable and DOCSIS functionality provided by the cable modem engine (paragraphs 5-6).

Regarding dependent claim 14, Schain does not the DOCSIS MAC processor is an RISC processor, and wherein the DOCSIS controller is an RISC processor (column 13, lines 26-36). Schain does not specifically teach ARM940-based or ARM9TDMI-based. However, both models are from a well know processor family. It would have been obvious to one of ordinary skill in the art at the time the invention was made that incorporating ARM 940-based processors in Schain's RISC processors would have been an acceptable selection. The motivation would have been because ARM 940 based processors have similar advantages.

Regarding claim 15, Schain taught a method for providing a flexible and partitioned cable modem gateway comprising:

providing data and home networking functionality in a data networking engine (column 4, lines 22-28);

providing DOCSIS and other functionality in a cable modem engine (column 4, lines 28-43; column 8, lines 35-48); and

partitioning the data networking engine from the cable modem engine so that the data and home networking functionality is completely decoupled from the DOCSIS and other functionality (column 10, lines 6-15). Schain does not specifically teach the other functionality is VoIP functionality in accordance with the PacketCable specification. However, Winters taught VoIP functionality is implemented in the DOCSIS controller of a cable modem in accordance with PacketCable specification (paragraphs 5-6). It would

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Art Unit: 2452

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have been obvious to one of ordinary skill in the art at the time the invention was made that incorporating Winter's VoIP functionality in Schain's cable modem would have extended functionality. The motivation would have been to expand functionality to include voice telephony and provide capabilities for other cable modem services.

Regarding dependent claim 16, Schain taught the data networking engine includes consumer provided equipment drivers including a USB driver and an Ethernet driver (column 11, lines 9-15). Schain does not specifically teach the data networking engine comprises the entire embedded portal services functionality of the CableHome specification. "Official notice" is taken embedded portal services functionality CableHome specification is well known in the art. It would have been obvious to one of ordinary skill in the art at the time the invention was made that incorporating the CableHome specification in Schain's data networking engine would have improved effectiveness. The motivation would have been to provide new services in a standardized manner.

Schain does not specifically teach the other functionality is VoIP functionality in accordance with the PacketCable specification. However, Winters taught VoIP functionality is implemented in the DOCSIS controller of a cable modem in accordance with PacketCable specification (paragraphs 5-6). It would have been obvious to one of ordinary skill in the art at the time the invention was made that incorporating Winter's VoIP functionality in Schain's cable modem would have extended functionality. The

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motivation would have to expand functionality to include voice telephony and provide capabilities for other cable modem services.

In combination Schain-Winter the CableHome functionality provided by the data networking engine is completely decoupled from the PacketCable and DOCSIS functionality provided by the cable modem engine (column 10, lines 6-15).

Allowable Subject Matter

Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the DOCSIS MAC processor is configured to process downstream PDU packets and forward the processed packets directly to the data networking engine without the involvement of the DOCSIS controller in order to boost downstream throughput.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PATRICE WINDER whose telephone number is (571)272-3935. The examiner can normally be reached on Monday-Friday, 12:00 pm - 8:30 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thu V. Nguyen can be reached on 571-272-6967. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Patrice L Winder/
Primary Examiner, Art Unit 2452

August 29, 2011

| | | | |
|-----------------------------------|---------------------------------------|---|-------------|
| Notice of References Cited | Application/Control No. 10/675,566 | Applicant(s)/Patent Under Reexamination LI ET AL. | |
| | Examiner PATRICE WINDER | Art Unit 2452 | Page 1 of 1 |

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| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Name | Classification |
|---|---|--|-----------------|----------------|----------------|
| * | A | US-6,944,706 B2 | 09-2005 | Schain et al. | 709/250 |
| * | B | US-2006/0080650 A1 | 04-2006 | Winters et al. | 717/168 |
| | C | US- | | | |
| | D | US- | | | |
| | E | US- | | | |
| | F | US- | | | |
| | G | US- | | | |
| | H | US- | | | |
| | I | US- | | | |
| | J | US- | | | |
| | K | US- | | | |
| | L | US- | | | |
| | M | US- | | | |


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| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Country | Name | Classification |
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| | N | | | | | |
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| | R | | | | | |
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| | T | | | | | |

NON-PATENT DOCUMENTS

| * | | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) |
|---|---|---|
| | U | |
| | V | |
| | W | |
| | X | |

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

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|---|--|---|
| <i>Search Notes</i>  | Application/Control No. 10675566 | Applicant(s)/Patent Under Reexamination LI ET AL. |
| | Examiner Patrice Winder | Art Unit 2452 |

| SEARCHED | | | |
|----------|----------|------|----------|
| Class | Subclass | Date | Examiner |
| | | | |

| SEARCH NOTES | | |
|---|-----------|----------|
| Search Notes | Date | Examiner |
| US Patents and PG Publications (using EAST) - see attached search history | 8-9-2011 | plw |
| US Patents and PG Publications (using EAST) - see attached search history | 8-25-2011 | plw |

| INTERFERENCE SEARCH | | | |
|---------------------|----------|------|----------|
| Class | Subclass | Date | Examiner |
| | | | |

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EAST Search History**EAST Search History (Prior Art)**

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|-------|-------|--|------------------------------|------------------|---------|---------------------|
| L1 | 1 | ("20010039600").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2011/08/25 20:57 |
| L2 | 773 | broadband adj2 gateway | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:04 |
| L3 | 43907 | cable adj2 modem | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:04 |
| L4 | 245 | l2 same2 l3 | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:04 |
| L5 | 131 | l4 and docsis | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:05 |
| L6 | 17 | l5 and (cablelab or packetcable or cablehome) | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:06 |
| L7 | 2791 | residential adj2 gateway | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:08 |
| L8 | 536 | l3 same2 l7 | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:08 |
| L9 | 207 | l8 and docsis | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:09 |
| L10 | 50 | l9 and (cablelab or packetcable or cablehome) | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:09 |
| L11 | 32 | l10 and (@ad<"20030930" or @rlad<"20030930") | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:10 |
| L12 | 85 | l5 and (@ad<"20030930" or @rlad<"20030930") | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:17 |
| L13 | 3171 | l3 same2 hub | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:23 |
| L14 | 2121 | l3 same hub | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:23 |
| L15 | 637 | l14 and docsis | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:23 |
| L16 | 436 | l15 and (@ad<"20030930" or @rlad<"20030930") | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:23 |
| L17 | 1665 | hub near8 (home adj2 network or data adj2 network) | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:24 |
| L18 | 96 | l3 same2 l17 | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:24 |
| L19 | 67 | l18 and (@ad<"20030930" or @rlad<"20030930") | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:24 |

| | | | | | | |
|-----|--------|---|--------------------|----|----|---------------------|
| L20 | 103172 | nat or newtork adj2 translat \$3 | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:31 |
| L21 | 0 | internal adj2 address near8 external adj2 address | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:32 |
| L22 | 5212 | (configur\$3 or configuration or provision\$3) near8 (vpn or virtual adj2 (private or network)) | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:32 |
| L23 | 3179 | internal adj2 address with external adj2 address | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:33 |
| L24 | 599 | l3 same2 (l20 or l22 or l23) | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:33 |
| L25 | 350 | l3 same (l20 or l22 or l23) | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:33 |
| L26 | 202 | l25 and (@ad<"20030930" or @rlad<"20030930") | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:33 |
| L27 | 34 | l26 and docsis | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:34 |
| L28 | 18 | (US-20030106067-\$ or US- 20100074267-\$).did. or (US- 7149474-\$ or US-7046796-\$ or US-6775273-\$ or US- 7460546-\$ or US-6944706-\$ or US-6889321-\$ or US- 6728239-\$ or US-7334252-\$ or US-6888850-\$ or US- 6588016-\$ or US-7620055-\$ or US-7590144-\$ or US- 7092397-\$ or US-6697864-\$ or US-6693878-\$ or US- 6577642-\$).did. | US-PGPUB; USPAT | OR | ON | 2011/08/25 21:52 |

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Workspace 1600x1200.wsp

EAST Search History**EAST Search History (Prior Art)**

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| L1 | 43598 | cable adj2 modem | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:00 |
| L2 | 48097 | co\$1process\$3 or bypass\$3 near8 process\$3 | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:01 |
| L3 | 182810 | vpn or virtual adj2 private or nat or network adj2 translat \$3 or firewall | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:01 |
| L4 | 282 | l2 same l3 | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:02 |
| L5 | 12 | l1 and l4 | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:02 |
| L6 | 4 | l5 and (@ad<"20030930" or @rlad<"20030930") | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:02 |
| L7 | 143 | l1 same2 l2 | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:03 |
| L8 | 2 | l7 and docis | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:03 |
| L9 | 2 | l8 and (@ad<"20030930" or @rlad<"20030930") | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:03 |
| L10 | 297101 | (multiple or plural\$3) near8 (processor or engine) | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:05 |
| L11 | 1177 | l1 same2 l10 | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:06 |
| L12 | 28560 | l10 same (independent or separate or distinct) | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:06 |
| L13 | 49 | l1 same2 l12 | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:07 |
| L14 | 35 | l13 and (@ad<"20030930" or @rlad<"20030930") | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:07 |

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|-----|-------|---|--------------------|----|----|---------------------|
| L15 | 1 | docis same engine | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:10 |
| L16 | 200 | docsis same engine | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:11 |
| L17 | 182 | l1 and l16 | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:11 |
| L18 | 133 | l17 and (@ad<"20030930" or @rlad<"20030930") | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:11 |
| L19 | 19 | l3 and l18 | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:11 |
| L20 | 3583 | gateway same cable adj2 modem | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:15 |
| L21 | 867 | l3 same2 l20 | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:15 |
| L22 | 571 | l3 same l20 | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:15 |
| L23 | 1 | l22 same (co\$1process\$3 or engine) | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:16 |
| L24 | 17 | l22 same2 (co\$1process\$3 or engine) | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:16 |
| L25 | 14 | l24 and (@ad<"20030930" or @rlad<"20030930") | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:16 |
| L26 | 11165 | l3 near8 gateway | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:17 |
| L27 | 793 | l20 and l26 | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:17 |
| L28 | 129 | l27 and partition\$3 | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:17 |
| L29 | 49 | l28 and (@ad<"20030930" or @rlad<"20030930") | US-PGPUB; USPAT | OR | ON | 2011/08/09 21:18 |
| L30 | 1 | (US-6944706-\$).did. | USPAT | OR | ON | 2011/08/09 21:22 |

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EAST Search History**EAST Search History (Prior Art)**

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|-------|--------|--|----------------------------|------------------|---------|---------------------|
| L1 | 0 | li-gordon\$.in. | US-PGPUB; USPAT | OR | ON | 2011/08/09 20:35 |
| L2 | 9 | li-gordon\$.in. | US-PGPUB; USPAT | OR | ON | 2011/08/09 20:35 |
| L3 | 11 | hebron-yoav\$.in. | US-PGPUB; USPAT | OR | ON | 2011/08/09 20:35 |
| L4 | 17 | l2 or l3 | US-PGPUB; USPAT | OR | ON | 2011/08/09 20:35 |
| L5 | 3074 | cable adj2 modem | FPRS; EPO; JPO; DERWENT | OR | ON | 2011/08/09 20:38 |
| L6 | 127992 | nat or network adj2 address adj2 translat\$3 or firewall or vpn or virtual adj2 private adj2 network \$3 | FPRS; EPO; JPO; DERWENT | OR | ON | 2011/08/09 20:42 |
| L7 | 1944 | l6 with (engine or process \$3) | FPRS; EPO; JPO; DERWENT | OR | ON | 2011/08/09 20:42 |
| L8 | 8 | l5 and l7 | FPRS; EPO; JPO; DERWENT | OR | ON | 2011/08/09 20:42 |
| L9 | 0 | l8 and @pd< "20030930" | FPRS; EPO; JPO; DERWENT | OR | ON | 2011/08/09 20:43 |
| L10 | 6189 | (independent or decoupl \$3 or distinct or different) near2 engine | FPRS; EPO; JPO; DERWENT | OR | ON | 2011/08/09 20:43 |
| L11 | 2 | l5 and l10 | FPRS; EPO; JPO; DERWENT | OR | ON | 2011/08/09 20:43 |
| L12 | 0 | l11 and @pd< "20030930" | FPRS; EPO; JPO; DERWENT | OR | ON | 2011/08/09 20:43 |
| L13 | 49 | l5 and engine | FPRS; EPO; JPO; DERWENT | OR | ON | 2011/08/09 20:44 |
| L14 | 9 | l13 and @pd< "20030930" | FPRS; EPO; JPO; DERWENT | OR | ON | 2011/08/09 20:44 |
| L15 | 4 | l6 same co\$1processor | FPRS; EPO; JPO; DERWENT | OR | ON | 2011/08/09 20:46 |
| L16 | 1 | l15 and @pd< "20030930" | FPRS; EPO; JPO; DERWENT | OR | ON | 2011/08/09 20:46 |
| L17 | 0 | l5 and co\$1processor | FPRS; EPO; JPO; DERWENT | OR | ON | 2011/08/09 20:46 |
| L18 | 58 | l5 and l6 | FPRS; EPO; JPO; DERWENT | OR | ON | 2011/08/09 20:47 |

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| L19 | 8 | I18 and @pd<"20030930" | FPRS; EPO; JPO; DERWENT | OR | ON | 2011/08/09 20:47 |
| L20 | 270 | functional near4 partition \$3 | FPRS; EPO; JPO; DERWENT | OR | ON | 2011/08/09 20:49 |
| L21 | 0 | I5 and I20 | FPRS; EPO; JPO; DERWENT | OR | ON | 2011/08/09 20:50 |

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| <i>Index of Claims</i>  | Application/Control No. 10675566 | Applicant(s)/Patent Under Reexamination LI ET AL. |
| | Examiner Patrice Winder | Art Unit 2452 |

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| N | Non-Elected |
| I | Interference |

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| A | Appeal |
| O | Objected |

| <input type="checkbox"/> Claims renumbered in the same order as presented by applicant | | <input type="checkbox"/> CPA | | <input type="checkbox"/> T.D. | | <input type="checkbox"/> R.1.47 | | | |
|--|----------|------------------------------|------------|-------------------------------|------------|---------------------------------|--|--|--|
| CLAIM | | DATE | | | | | | | |
| Final | Original | 02/16/2009 | 08/24/2009 | 01/30/2010 | 08/29/2011 | | | | |
| | 1 | ✓ | ÷ | ✓ | ✓ | | | | |
| | 2 | ✓ | ÷ | ✓ | ✓ | | | | |
| | 3 | ✓ | ÷ | ✓ | ✓ | | | | |
| | 4 | ✓ | ÷ | ✓ | ✓ | | | | |
| | 5 | ✓ | ÷ | ✓ | ✓ | | | | |
| | 6 | ✓ | ÷ | ✓ | ✓ | | | | |
| | 7 | ✓ | ÷ | ✓ | ✓ | | | | |
| | 8 | ✓ | ÷ | ✓ | ✓ | | | | |
| | 9 | ✓ | ÷ | ✓ | ✓ | | | | |
| | 10 | ✓ | ÷ | ✓ | ✓ | | | | |
| | 11 | ✓ | ÷ | ✓ | ✓ | | | | |
| | 12 | ✓ | ÷ | ✓ | ✓ | | | | |
| | 13 | ✓ | ÷ | ✓ | ✓ | | | | |
| | 14 | ✓ | ÷ | ✓ | ✓ | | | | |
| | 15 | ✓ | ÷ | ✓ | ✓ | | | | |
| | 16 | | ÷ | ✓ | ✓ | | | | |

Appln. No.: 10/675,566
Amend/Response filed Mar. 2, 2012
Responsive to Office action of Sept. 2, 2011

PATENT
348162-982350

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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|----------------------|---|--------------------|------------|------|
| Appln. No. | : | 10/675,566 | Conf. No.: | 9980 |
| First Named Inventor | : | Gordon Y. Li | | |
| Filed | : | September 30, 2003 | | |
| Art Unit | : | 2452 | | |
| Examiner | : | Winder, Patrice L. | | |
| Docket No. | : | 348162-982350 | | |

Title: Architecture For A Flexible And High-Performance Gateway Cable Modem

AMENDMENT AND RESPONSE TO OFFICE ACTION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Madam:

In response to the Office action mailed September 2, 2011, please enter the amendments set forth below and consider the following remarks.

Amendments to the Claims are reflected in the listing of claims that begins on page 2 of this paper.

Remarks begin on page 9 of this paper.

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Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. **(Canceled)**
2. **(Currently Amended)** A cable modem system as claimed in claim [[1]] 7, wherein all DOCSIS functions are localized in the cable modem engine.
3. **(Original)** A cable modem system as claimed in claim 2, wherein VoIP functionality is embedded in the cable modem engine.
4. **(Currently Amended)** A cable modem system as claimed in claim [[1]] 7, and further comprising an advanced crypto engine configured to perform all crypto functions for both the data networking engine and the cable modem engine, the advanced crypto engine being separate from both the data networking engine and the cable modem engine.
5. **(Canceled)**
6. **(Currently Amended)** A cable modem system as claimed in claim [[5]] 7, wherein the DOCSIS PHY layer includes a hardware transmitter and receiver.
7. **(Currently Amended)** A cable modem system comprising: as claimed in claim 5,
a data networking engine implemented in a first circuit that includes at least one
processor, the data networking engine programmed with software that when executed
by the at least one processor of the first circuit causes the data networking engine to

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perform home networking functions including interfacing with customer provided equipment, wherein the at least one processor is a RISC processor;

a cable modem engine implemented in a second circuit that includes at least one processor, the second circuit being separate from the first circuit, the cable modem engine including a DOCSIS PHY layer, a DOCSIS controller, and a DOCSIS controller and programmed with software that when executed by the at least one processor of the second circuit causes the cable modem engine to perform cable modem functions other than the home networking functions performed by the data networking engine, the cable modem functions including interfacing with cable media, the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine; and

a data bus that connects the data networking engine to the cable modem engine, wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine;

wherein the DOCSIS MAC processor is configured to process downstream PDU packets and forward the processed packets directly to the data networking engine without the involvement of the DOCSIS controller in order to boost downstream throughput.

8. **(Currently Amended)** A cable modem system as claimed in claim [[5]] 7, wherein all VoIP functionality is implemented in the DOCSIS controller.

9. **(Original)** A cable modem system as claimed in claim 8, wherein the VoIP functionality is in conformance with the PacketCable specification.

10. **(Currently Amended)** A cable modem system as claimed in claim [[5]] 7, wherein the data networking engine is configured to perform all data networking processing

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including advanced multi-port bridging routing with NAT/firewall and VPN, and home networking applications.

11. **(Original)** A cable modem system as claimed in claim 10, wherein the data networking engine comprises the entire embedded portal services functionality of the CableHome specification.

12. **(Currently Amended)** A cable modem system as claimed in claim [[5]] 7, wherein with regard to the cable modem engine includes:

- the DOCSIS PHY layer includes a transmitter and receiver;
- the DOCSIS MAC processor is configured to implement real-time MAC functions for both upstream and downstream communications; and
- the DOCSIS controller is configured to implement VoIP functionality; and wherein the data networking engine includes a RISC processor configured to implement a majority of data networking processing and home networking applications decoupled from the implementation of the MAC functions and the VoIP functionality of the cable modem engine.

13. **(Currently Amended)** A cable modem ~~architecture~~ system as claimed in claim 12, wherein the DOCSIS controller is configured to provide VoIP functionality in accordance with the PacketCable specification, wherein the data networking engine is configured to provide the embedded portal services functionality of the CableHome specification, and wherein the CableHome functionality provided by the data networking engine is completely decoupled from the PacketCable and DOCSIS functionality provided by the cable modem engine.

14. **(Currently Amended)** A cable modem ~~architecture~~ system as claimed in claim 13, wherein the DOCSIS MAC processor is an ARM9TDMI-based RISC processor, and wherein the DOCSIS controller is an ARM940-based RISC processor.

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15. **(Currently Amended)** A method ~~of for~~ cable modem operation as claimed in claim 17, further comprising:

providing a flexible and partitioned cable modem gateway comprising:
 providing data and home networking functionality in the data networking engine;
 providing DOCSIS and VoIP functionality in the cable modem engine; and
 partitioning the data networking engine from the cable modem engine so that the data and home networking functionality is completely decoupled from the DOCSIS and VoIP functionality.

16. **(Currently Amended)** A cable modem system as claimed in claim ~~[[5]]~~ 7, wherein the data networking engine includes consumer provided equipment drivers including a USB driver and an Ethernet driver and the data networking engine is configured to provide the embedded portal services functionality of the CableHome specification, wherein the DOCSIS controller is configured to provide VoIP functionality in accordance with the PacketCable specification, and wherein the CableHome functionality provided by the data networking engine is completely decoupled from the PacketCable and DOCSIS functionality provided by the cable modem engine.

17. **(New)** A method of cable modem operation comprising:

 executing, via at least one processor of a first circuit that implements a data networking engine, first software that causes the data networking engine to perform home networking functions including interfacing with customer provided equipment, wherein the at least one processor is a RISC processor;

 executing, via one or more processors of a second circuit that implements a cable modem engine programmed with second software, the second software to cause the cable modem engine to perform cable modem functions other than the home networking functions performed by the data networking engine, the cable modem

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functions including interfacing with cable media, the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine, wherein the second circuit is separate from the first circuit, and wherein the cable modem engine includes a DOCSIS PHY layer, a DOCSIS controller and a DOCSIS controller;

connecting, via a data bus, the data networking engine to the cable modem engine, wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine;

processing, via the DOCSIS MAC processor, downstream PDU packets and forwarding the processed packets directly to the data networking engine without the involvement of the DOCSIS controller in order to boost downstream throughput.

18. **(New)** A method as claimed in claim 17, further comprising:

providing VoIP functionality in accordance with the PacketCable specification in the DOCSIS controller; and

providing the embedded portal services functionality of the CableHome specification in the data networking engine;

wherein the CableHome functionality provided by the data networking engine is completely decoupled from the PacketCable and DOCSIS functionality provided by the cable modem engine.

19. **(New)** A method as claimed in claim 17, further comprising:

providing the embedded portal services functionality of the CableHome specification in the data networking engine; and

providing VoIP functionality in accordance with the PacketCable specification in the DOCSIS controller;

wherein the data networking engine includes consumer provided equipment drivers including a USB driver and an Ethernet driver; and

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wherein the CableHome functionality provided by the data networking engine is completely decoupled from the PacketCable and DOCSIS functionality provided by the cable modem engine.

20. **(New)** A cable modem system comprising:

a data networking engine implemented in a first circuit that includes at least one processor, the data networking engine programmed with software that when executed by the at least one processor of the first circuit causes the data networking engine to perform home networking functions including interfacing with customer provided equipment;

a cable modem engine implemented in a second circuit that includes at least one processor, the second circuit being separate from the first circuit, the cable modem engine programmed with software that when executed by the at least one processor of the second circuit causes the cable modem engine to perform cable modem functions other than the home networking functions performed by the data networking engine, the cable modem functions including interfacing with cable media, and the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine, the cable modem engine including a DOCSIS controller and a DOCSIS MAC processor, the DOCSIS MAC processor configured to process downstream PDU packets and forward the processed packets directly to the data networking engine without the involvement of the DOCSIS controller in order to boost downstream throughput; and

a data bus that connects the data networking engine to the cable modem engine, wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine.

21. **(New)** A cable modem system as claimed in claim 20, wherein all DOCSIS functions are localized in the cable modem engine.

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22. **(New)** The cable modem system as claimed in claim 20 wherein the DOCSIS MAC processor is configured to implement real-time MAC functions for both upstream and downstream communications.

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REMARKS

In reply to the non-final Office Action mailed September 2, 2011, please enter the amendments set forth above and consider the following remarks. By this response, Applicants cancel claims 1 and 5 without prejudice or disclaimer, amend claims 2, 4, 6-8, 10, 12-15, and 16, and present new claims 17-22. No new matter has been added. After entry of this paper, claims 2-4 and 6-22 will be pending in this application.

In the Office action, the Examiner (i) rejected claims 1-2, 4-6, 10 and 11 under 35 U.S.C. 103(a), as being anticipated by Schain et al. (US 6,944,706 B2); (ii) rejected claims 3, 8, 9, 12-16 under 35 U.S.C. 103(a) as being unpatentable over Schain et al. as applied to claims 2, 5 above, and further in view of Winters et al. (US 2006/0080650 A1). With regard to the rejections, Applicants respectfully traverse, submitting that the standing rejections are unsupportable/moot/overcome as against the claims presented for at least the reasons set forth below. Reconsideration is respectfully requested.

Claim Rejections Under 35 USC § 103 (a)

Claims 1-2, 4-6, 10 and 11 stand rejected under 35 U.S.C. 103(a), as being anticipated by Schain et al. (US 6,944,706 B2).

Claims 3, 8, 9, 12-16 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Schain et al. as applied to claims 2, 5 above, and further in view of Winters et al. (US 2006/0080650 A1).

Applicants respectfully traverse these rejections.

As an initial matter, Applicants have canceled claims 1 and 5 without prejudice or disclaimer, and respectfully submit the rejections against these claims are moot..

Further and without acquiescence, in the interests, e.g., of advancing the prosecution of this case, avoiding additional costs, etc., Applicants have canceled the rejected claims, or amended the claims to depend from a claim indicated as allowable by the Examiner. Accordingly, Applicants submits that the rejections are moot or now unsupported in view of the amended claims, and respectfully request that they be withdrawn.

Specifically, the Examiner indicates on page 9 of the Office Action that claim 7 is allowable if rewritten in independent form. Claim 7 has been rewritten in independent

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form, and claims 2-4, 6, 8-14, and 16 depend directly or indirectly on claim 7. Independent claim 15 has been amended to depend on new claim 17 which recites subject matter indicated as allowable by the Examiner (see, e.g., Office Action, pg. 9).

New Claims

Claims 17-22 are new claims presented in place of the claims canceled by Applicant without prejudice or disclaimer. New claims 17-22 are either copies of existing claims (with different dependencies or additional language) or are new claims reciting features indicated to be patentable. Further, all of these claims either depend on allowable claims or recite subject matter consistent with existing allowable claims. Accordingly, Applicants respectfully submit that these new claims present no new matter, and are allowable for at least the same reasons as their related claims.

Closing Remarks

In view of the above, it is respectfully submitted that the claims are now in condition for formal allowance, and early and favorable action to that end is respectfully requested.

The Examiner is encouraged to call Applicants' attorney at the number below if doing so will in any way advance the prosecution of this application.

The Commissioner is hereby petitioned to grant any extensions of time required to enter this paper as well as authorized to charge any fees which may be required, or credit in the overpayment, to Deposit Account No. 07-1896 referencing Attorney Docket No. 348162-982350.

Respectfully submitted,

DLA PIPER US LLP

By: /Andy Schwaab/
Andrew B. Schwaab
Reg. No. 38,611
Attorneys for Applicant

Dated: March 2, 2012

DLA PIPER US LLP
2000 University Avenue
East Palo Alto, CA 94303
Atty direct (650) 833-2258

| Electronic Patent Application Fee Transmittal | | | | |
|--|-----------------|--|---------------|-----------------------------|
| Application Number: | | 10675566 | | |
| Filing Date: | | 30-Sep-2003 | | |
| Title of Invention: | | Architecture for a flexible and high-performance gateway cable modem | | |
| First Named Inventor/Applicant Name: | | Gordon Y. Li | | |
| Filer: | | Andrew B. Schwaab | | |
| Attorney Docket Number: | | 348162-982350 | | |
| Filed as Large Entity | | | | |
| Utility under 35 USC 111(a) Filing Fees | | | | |
| Description | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
| Basic Filing: | | | | |
| Pages: | | | | |
| Claims: | | | | |
| Miscellaneous-Filing: | | | | |
| Petition: | | | | |
| Patent-Appeals-and-Interference: | | | | |
| Post-Allowance-and-Post-Issuance: | | | | |
| Extension-of-Time: | | | | |
| Extension - 3 months with \$0 paid | 1253 | 1 | 1270 | 1270 |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
|-------------------|----------|----------|--------|----------------------|
| Miscellaneous: | | | | |
| Total in USD (\$) | | | | 1270 |

Electronic Acknowledgement Receipt

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| EFS ID: | 12217941 |
| Application Number: | 10675566 |
| International Application Number: | |
| Confirmation Number: | 9980 |
| Title of Invention: | Architecture for a flexible and high-performance gateway cable modem |
| First Named Inventor/Applicant Name: | Gordon Y. Li |
| Customer Number: | 94518 |
| Filer: | Andrew B. Schwaab |
| Filer Authorized By: | |
| Attorney Docket Number: | 348162-982350 |
| Receipt Date: | 02-MAR-2012 |
| Filing Date: | 30-SEP-2003 |
| Time Stamp: | 20:54:34 |
| Application Type: | Utility under 35 USC 111(a) |

Payment information:

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| Submitted with Payment | yes |
| Payment Type | Deposit Account |
| Payment was successfully received in RAM | \$ 1270 |
| RAM confirmation Number | 6509 |
| Deposit Account | 071896 |
| Authorized User | |

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File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|-----------------|---|--|---------------------------------------|------------------|------------------|
| 1 | Amendment/Req. Reconsideration-After Non-Final Reject | Response_To_9-2-11_Office_Action_348162-982350.pdf | 71995 | no | 10 |
| | | | 32c0a0e6e0fb9d36e7a8133d479cecf989765 | | |

Warnings:**Information:**

| | | | | | |
|---|----------------------|--------------|--|----|---|
| 2 | Fee Worksheet (SB06) | fee-info.pdf | 30020 | no | 2 |
| | | | 7615d5d1392763b8313f940579deaa5f4602b94b | | |

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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PTO/SB/06 (07-06)

Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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| PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875 | | | | | Application or Docket Number 10/675,566 | | Filing Date 09/30/2003 | | <input type="checkbox"/> To be Mailed | | | | |
|---|--|----------------------------------|-----------|--|---|-------------------------|----------------------------------|-------------------------|---------------------------------------|---------------------|--|---------------------|--|
| APPLICATION AS FILED – PART I | | | | | | | | | | | | | |
| (Column 1) | | (Column 2) | | SMALL ENTITY <input type="checkbox"/> OR | | OTHER THAN SMALL ENTITY | | | | | | | |
| FOR | NUMBER FILED | NUMBER EXTRA | RATE (\$) | FEE (\$) | OR | RATE (\$) | FEE (\$) | | | | | | |
| <input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c)) | N/A | N/A | N/A | | | N/A | | | | | | | |
| <input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (i), or (m)) | N/A | N/A | N/A | | | N/A | | | | | | | |
| <input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | N/A | N/A | N/A | | | N/A | | | | | | | |
| TOTAL CLAIMS (37 CFR 1.16(i)) | minus 20 = | * | X \$ | = | OR | X \$ | = | | | | | | |
| INDEPENDENT CLAIMS (37 CFR 1.16(h)) | minus 3 = | * | X \$ | = | | X \$ | = | | | | | | |
| <input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s)) <div style="font-size: small;">If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).</div> | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| <input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | | | | | | | | | | | | |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | | | TOTAL | | | | | | | |
| APPLICATION AS AMENDED – PART II | | | | | | | | | | | | | |
| (Column 1) | | (Column 2) | | (Column 3) | | SMALL ENTITY OR | | OTHER THAN SMALL ENTITY | | | | | |
| AMENDMENT | 03/02/2012 | CLAIMS REMAINING AFTER AMENDMENT | | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | RATE (\$) | ADDITIONAL FEE (\$) | | RATE (\$) | ADDITIONAL FEE (\$) | | | |
| | Total (37 CFR 1.16(i)) | * 20 | Minus | ** 20 | = 0 | X \$ | = | OR | X \$60= | 0 | | | |
| | Independent (37 CFR 1.16(h)) | * 3 | Minus | ***3 | = 0 | X \$ | = | OR | X \$250= | 0 | | | |
| | <input type="checkbox"/> Application Size Fee (37 CFR 1.16(s)) | | | | | | | | | | | | |
| | <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | | OR | | | | | |
| | | | | | | TOTAL ADD'L FEE | | OR | TOTAL ADD'L FEE | 0 | | | |
| (Column 1) | | (Column 2) | | (Column 3) | | RATE (\$) | | ADDITIONAL FEE (\$) | | RATE (\$) | | ADDITIONAL FEE (\$) | |
| AMENDMENT | | CLAIMS REMAINING AFTER AMENDMENT | | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | X \$ | = | OR | X \$ | = | | | |
| | Total (37 CFR 1.16(i)) | * | Minus | ** | = | X \$ | = | OR | X \$ | = | | | |
| | Independent (37 CFR 1.16(h)) | * | Minus | *** | = | | | | | | | | |
| | <input type="checkbox"/> Application Size Fee (37 CFR 1.16(s)) | | | | | | | OR | | | | | |
| | <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | TOTAL ADD'L FEE | | OR | TOTAL ADD'L FEE | | | | |
| | | | | | | | | | | | | | |
| * If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1. | | | | | | | | | | | | | |

Legal Instrument Examiner:
/DIANA BATES/

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94518 7590 03/19/2012
 DLA PIPER LLP (US)
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EXAMINER

WINDER, PATRICE L

ART UNIT

PAPER NUMBER

2452

DATE MAILED: 03/19/2012

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/675,566 | 09/30/2003 | Gordon Y. Li | 348162-982350 | 9980 |

TITLE OF INVENTION: ARCHITECTURE FOR A FLEXIBLE AND HIGH-PERFORMANCE GATEWAY CABLE MODEM

| APPLN. TYPE | SMALL ENTITY | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE |
|----------------|--------------|---------------|---------------------|----------------------|------------------|------------|
| nonprovisional | NO | \$1740 | \$300 | \$0 | \$2040 | 06/19/2012 |

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/675,566 | 09/30/2003 | Gordon Y. Li | 348162-982350 | 9980 |

TITLE OF INVENTION: ARCHITECTURE FOR A FLEXIBLE AND HIGH-PERFORMANCE GATEWAY CABLE MODEM

| APPLN. TYPE | SMALL ENTITY | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE |
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| nonprovisional | NO | \$1740 | \$300 | \$0 | \$2040 | 06/19/2012 |

| EXAMINER | ART UNIT | CLASS-SUBCLASS |
|-------------------|----------|----------------|
| WINDER, PATRICE L | 2452 | 370-401000 |

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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/675,566 | 09/30/2003 | Gordon Y. Li | 348162-982350 | 9980 |
| 94518 | 7590 | 03/19/2012 | EXAMINER | |
| DLA PIPER LLP (US) 2000 UNIVERSITY AVENUE EAST PALO ALTO, CA 94303 | | | WINDER, PATRICE L | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2452 | |
| DATE MAILED: 03/19/2012 | | | | |

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)

(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 1748 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 1748 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
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4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

| | | | |
|-------------------------------|------------------------|---------------------|--|
| Notice of Allowability | Application No. | Applicant(s) | |
| | 10/675,566 | LI ET AL. | |
| | Examiner | Art Unit | |
| | PATRICE WINDER | 2452 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 3-2-2012.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 2-4 and 6-22.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____ .
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
* Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
(a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
1) ☐ hereto or 2) ☐ to Paper No./Mail Date ____.
(b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

| | |
|--|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date ____ 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material | 5. <input type="checkbox"/> Notice of Informal Patent Application 6. <input type="checkbox"/> Interview Summary (PTO-413), Paper No./Mail Date ____ . 7. <input type="checkbox"/> Examiner's Amendment/Comment 8. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance 9. <input type="checkbox"/> Other ____ . |
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|---|--|
| /Patrice L Winder/ Primary Examiner, Art Unit 2452 | |
|---|--|

EAST Search History**EAST Search History (Prior Art)**


| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|-------|---------|---|-----------------|------------------|---------|------------------|
| L1 | 4146 | (broadband or residential) near2 gateway | US-PGPUB; USPAT | OR | ON | 2012/03/10 16:47 |
| L2 | 49219 | cable near2 modem | US-PGPUB; USPAT | OR | ON | 2012/03/10 16:47 |
| L3 | 843 | l1 same2 l2 | US-PGPUB; USPAT | OR | ON | 2012/03/10 16:48 |
| L4 | 2 | l3 and docis | US-PGPUB; USPAT | OR | ON | 2012/03/10 16:48 |
| L5 | 43 | l3 and (cablelav or cablehome or packetcable) | US-PGPUB; USPAT | OR | ON | 2012/03/10 16:49 |
| L6 | 30 | l5 and (@ad<"20030930" or @rlad<"20030930") | US-PGPUB; USPAT | OR | ON | 2012/03/10 16:53 |
| L7 | 8281 | hub same ((home or data) near2 network) | US-PGPUB; USPAT | OR | ON | 2012/03/10 16:57 |
| L8 | 1 | l2 and docis and l7 | US-PGPUB; USPAT | OR | ON | 2012/03/10 16:58 |
| L9 | 2986 | l2 and l7 | US-PGPUB; USPAT | OR | ON | 2012/03/10 16:58 |
| L10 | 534 | l2 same2 l7 | US-PGPUB; USPAT | OR | ON | 2012/03/10 16:58 |
| L11 | 1994034 | nat or network ad2 translat\$3 | US-PGPUB; USPAT | OR | ON | 2012/03/10 16:58 |
| L12 | 6049 | (internal or private) near2 address with (external or public) near2 address | US-PGPUB; USPAT | OR | ON | 2012/03/10 16:59 |
| L13 | 534 | l10 and (l11 or l12) | US-PGPUB; USPAT | OR | ON | 2012/03/10 16:59 |
| L14 | 112980 | nat or network adj2 address adj2 translat\$3 | US-PGPUB; USPAT | OR | ON | 2012/03/10 17:00 |
| L15 | 50 | l10 and (l12 or l14) | US-PGPUB; USPAT | OR | ON | 2012/03/10 17:00 |
| L16 | 28 | l15 and (@ad<"20030930" or @rlad<"20030930") | US-PGPUB; | OR | ON | 2012/03/10 17:00 |

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|----|---|---------------------|--------------------|----|-----|---------------------|
| | | | USPAT | | | |
| S1 | 1 | ("20040139233").PN. | US-PGPUB; USPAT | OR | OFF | 2012/02/10 17:25 |

EAST Search History (Interference)

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|-------|------|--|-----------------------------|------------------|---------|---------------------|
| L17 | 636 | (broadband or residential).clm. near2 gateway.clm. | US-PGPUB; USPAT; UPAD | OR | ON | 2012/03/10 17:22 |
| L18 | 2826 | cable.clm. near2 modem.clm. | US-PGPUB; USPAT; UPAD | OR | ON | 2012/03/10 17:22 |
| L19 | 0 | l17 and l18 and docis.clm. | US-PGPUB; USPAT; UPAD | OR | ON | 2012/03/10 17:23 |
| L20 | 0 | l17 and l18 and (cablelab or cablehome or packetcable).clm. | US-PGPUB; USPAT; UPAD | OR | ON | 2012/03/10 17:23 |
| L21 | 924 | hub.clm. and ((home or data).clm. near2 network.clm.) | US-PGPUB; USPAT; UPAD | OR | ON | 2012/03/10 17:24 |
| L22 | 0 | l17 and l18 and l21 | US-PGPUB; USPAT; UPAD | OR | ON | 2012/03/10 17:24 |
| L23 | 1679 | (internal or private).clm. near2 address.clm. and (external or public).clm. near2 address.clm. | US-PGPUB; USPAT; UPAD | OR | ON | 2012/03/10 17:25 |
| L24 | 2332 | nat.clm. or network.clm. adj2 address.clm. adj2 translat\$3.clm. | US-PGPUB; USPAT; UPAD | OR | ON | 2012/03/10 17:26 |
| L25 | 2 | l17 and l18 and (l23 or l24) | US-PGPUB; USPAT; UPAD | OR | ON | 2012/03/10 17:26 |
| L26 | 30 | l18 and l21 | US-PGPUB; USPAT; UPAD | OR | ON | 2012/03/10 17:29 |
| L27 | 0 | l26 and docis.clm. | US-PGPUB; USPAT; UPAD | OR | ON | 2012/03/10 17:30 |


3/ 10/ 2012 5:30:38 PM**C:\Users\pwinder\Documents\EAST\Workspaces\10675566_03102012_Allow.wsp**

| | | |
|--|--|---|
| Issue Classification  | Application/Control No. 10675566 | Applicant(s)/Patent Under Reexamination LI ET AL. |
| | Examiner PATRICE WINDER | Art Unit 2452 |

| ORIGINAL | | | | | | INTERNATIONAL CLASSIFICATION | | | | | | | | | | | | |
|--------------------|-----------------------------------|----------|--|--|--|------------------------------|---|---|---|------------------|-------------|--|--|--|--|--|--|--|
| CLASS | | SUBCLASS | | | | CLAIMED | | | | | NON-CLAIMED | | | | | | | |
| 370 | | 401 | | | | H | O | 4 | L | 12 / 46 (2006.0) | | | | | | | | |
| CROSS REFERENCE(S) | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| CLASS | SUBCLASS (ONE SUBCLASS PER BLOCK) | | | | | | | | | | | | | | | | | |
| 709 | 249 | | | | | | | | | | | | | | | | | |
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| <input type="checkbox"/> Claims renumbered in the same order as presented by applicant <input type="checkbox"/> CPA <input type="checkbox"/> T.D. <input type="checkbox"/> R.1.47 | | | | | | | | | | | | | | | |
|---|----------|-------|----------|-------|----------|-------|----------|-------|----------|-------|----------|-------|----------|-------|----------|
| Final | Original | Final | Original | Final | Original | Final | Original | Final | Original | Final | Original | Final | Original | Final | Original |
| | 1 | 14 | 17 | | | | | | | | | | | | |
| 2 | 2 | 16 | 18 | | | | | | | | | | | | |
| 3 | 3 | 17 | 19 | | | | | | | | | | | | |
| 4 | 4 | 18 | 20 | | | | | | | | | | | | |
| | 5 | 19 | 21 | | | | | | | | | | | | |
| 5 | 6 | 20 | 22 | | | | | | | | | | | | |
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| 13 | 16 | | | | | | | | | | | | | | |

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|--|--|-----------------------|-------------------|
| NONE | | Total Claims Allowed: | |
| (Assistant Examiner) | | 20 | |
| (Date) | | | |
| /PATRICE WINDER/ Primary Examiner.Art Unit 2452 | | O.G. Print Claim(s) | O.G. Print Figure |
| (Primary Examiner) | | 1 | 2 |
| (Date) | | | |

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| <i>Search Notes</i>  | Application/Control No. 10675566 | Applicant(s)/Patent Under Reexamination LI ET AL. |
| | Examiner Patrice Winder | Art Unit 2452 |

| SEARCHED | | | |
|----------|----------|-----------|----------|
| Class | Subclass | Date | Examiner |
| 709 | 249 | 3-10-2012 | plw |

| SEARCH NOTES | | |
|---|-----------|----------|
| Search Notes | Date | Examiner |
| US Patents and PG Publications (using EAST) - see attached search history | 3-10-2012 | plw |

| INTERFERENCE SEARCH | | | |
|---------------------|--|-----------|----------|
| Class | Subclass | Date | Examiner |
| 709 | 249 | 3-10-2012 | plw |
| | PG PUB text search of CLAIMS (using EAST) - see attached search printout | 3-10-2012 | plw |

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 Alexandria, Virginia 22313-1450
 www.uspto.gov

BIB DATA SHEET

CONFIRMATION NO. 9980

| SERIAL NUMBER | FILING or 371(c) DATE | CLASS | GROUP ART UNIT | ATTORNEY DOCKET NO. | | |
|---|---|--|-----------------------------------|---|-------------------------------|------------------------------------|
| 10/675,566 | 09/30/2003 | 370 | 2452 | 348162-982350 | | |
| RULE | | | | | | |
| APPLICANTS Gordon Y. Li, San Diego, CA; Yoav Hebron, San Diego, CA; | | | | | | |
| ** CONTINUING DATA ***** ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 12/23/2003 | | | | | | |
| Foreign Priority claimed <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No 35 USC 119(a-d) conditions met <input type="checkbox"/> Yes <input type="checkbox"/> No Verified and /PATRICE L WINDER/ Acknowledged Examiner's Signature | | <input type="checkbox"/> Met after Allowance Initials | STATE OR COUNTRY CA | SHEETS DRAWINGS 2 | TOTAL CLAIMS 15 | INDEPENDENT CLAIMS 3 |
| ADDRESS DLA PIPER LLP (US) 2000 UNIVERSITY AVENUE EAST PALO ALTO, CA 94303 UNITED STATES | | | | | | |
| TITLE Architecture for a flexible and high-performance gateway cable modem | | | | | | |
| FILING FEE RECEIVED 900 | FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following: | | | <input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit | | |

| | | |
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| <i>Index of Claims</i>  | Application/Control No. 10675566 | Applicant(s)/Patent Under Reexamination LI ET AL. |
| | Examiner PATRICE WINDER | Art Unit 2452 |

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|---|-----------------|---|-------------------|---|---------------------|---|-----------------|
| ✓ | Rejected | - | Cancelled | N | Non-Elected | A | Appeal |
| = | Allowed | ÷ | Restricted | I | Interference | O | Objected |

| <input type="checkbox"/> Claims renumbered in the same order as presented by applicant | | <input type="checkbox"/> CPA | | <input type="checkbox"/> T.D. | | <input type="checkbox"/> R.1.47 | | | |
|--|----------|------------------------------|------------|-------------------------------|------------|---------------------------------|--|--|--|
| CLAIM | | DATE | | | | | | | |
| Final | Original | 02/16/2009 | 08/24/2009 | 01/30/2010 | 08/29/2011 | 03/10/2012 | | | |
| | 1 | ✓ | ÷ | ✓ | ✓ | - | | | |
| 2 | 2 | ✓ | ÷ | ✓ | ✓ | = | | | |
| 3 | 3 | ✓ | ÷ | ✓ | ✓ | = | | | |
| 4 | 4 | ✓ | ÷ | ✓ | ✓ | = | | | |
| | 5 | ✓ | ÷ | ✓ | ✓ | - | | | |
| 5 | 6 | ✓ | ÷ | ✓ | ✓ | = | | | |
| 1 | 7 | ✓ | ÷ | ✓ | ✓ | = | | | |
| 6 | 8 | ✓ | ÷ | ✓ | ✓ | = | | | |
| 7 | 9 | ✓ | ÷ | ✓ | ✓ | = | | | |
| 8 | 10 | ✓ | ÷ | ✓ | ✓ | = | | | |
| 9 | 11 | ✓ | ÷ | ✓ | ✓ | = | | | |
| 10 | 12 | ✓ | ÷ | ✓ | ✓ | = | | | |
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| 19 | 21 | | | | | = | | | |
| 20 | 22 | | | | | = | | | |

To: PATENTDOCKETINGUS-PALOALTO@DLAPIPER.COM,,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 94518

Mar 19, 2012 05:22:40 AM

Dear PAIR Customer:

DLA PIPER LLP (US)
2000 UNIVERSITY AVENUE
EAST PALO ALTO, CA 94303
UNITED STATES

The following USPTO patent application(s) associated with your Customer Number, 94518 , have new outgoing correspondence. This correspondence is now available for viewing in Private PAIR.

The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

Disclaimer:

The list of documents shown below is provided as a courtesy and is not part of the official file wrapper. The content of the images shown in PAIR is the official record.

| Application | Document | Mailroom Date | Attorney Docket No. |
|-------------|----------|---------------|---------------------|
| 10675566 | NOA | 03/19/2012 | 348162-982350 |

To view your correspondence online or update your email addresses, please visit us anytime at <https://sportal.uspto.gov/secure/myportal/privatepair>.

If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov with 'e-Office Action' on the subject line or call 1-866-217-9197 during the following hours:

Monday - Friday 6:00 a.m. to 12:00 a.m.

Thank you for prompt attention to this notice,

UNITED STATES PATENT AND TRADEMARK OFFICE
PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

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Complete and send this form, together with applicable fee(s), to: **Mail** Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
 or **Fax** (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

94518 7590 03/19/2012
~~DLA-PIPER LLP (US)~~ Duane Morris LLP
~~2000 UNIVERSITY AVENUE~~ Suite 2900
~~EAST BALTIMORE, CA 94303~~ 750 B Street
 San Diego, CA 92101
 USA

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

| | |
|--------------------|--------------------|
| Ruth Der | (Depositor's name) |
| <i>[Signature]</i> | (Signature) |
| June 14, 2012 | (Date) |

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/675,566 | 09/30/2003 | Gordon Y. Li | E5982-00282 | 9980 |

TITLE OF INVENTION: ARCHITECTURE FOR A FLEXIBLE AND HIGH-PERFORMANCE GATEWAY CABLE MODEM

| APPLN. TYPE | SMALL ENTITY | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE |
|----------------|--------------|---------------|---------------------|----------------------|------------------|------------|
| nonprovisional | NO | \$1740 | \$300 | \$0 | \$2040 | 06/19/2012 |

| EXAMINER | ART UNIT | CLASS-SUBCLASS |
|-------------------|----------|----------------|
| WINDER, PATRICE L | 2452 | 370-401000 |

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☒ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 James Sze

2 Duane Morris LLP

3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

ENTROPIC COMMUNICATIONS, INC.

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

☒ Issue Fee

☐ Publication Fee (No small entity discount permitted)

☐ Advance Order - # of Copies

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

☐ A check is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 041679 (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

☒ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature /James Sze/

Date June 14, 2012

Typed or printed name James Sze

Registration No. 43,943

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

| Electronic Patent Application Fee Transmittal | | | | |
|--|-----------------|--|---------------|-----------------------------|
| Application Number: | | 10675566 | | |
| Filing Date: | | 30-Sep-2003 | | |
| Title of Invention: | | ARCHITECTURE FOR A FLEXIBLE AND HIGH-PERFORMANCE GATEWAY CABLE MODEM | | |
| First Named Inventor/Applicant Name: | | Gordon Y. Li | | |
| Filer: | | James Y.C. Sze | | |
| Attorney Docket Number: | | 348162-982350 | | |
| Filed as Large Entity | | | | |
| Utility under 35 USC 111(a) Filing Fees | | | | |
| Description | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
| Basic Filing: | | | | |
| Pages: | | | | |
| Claims: | | | | |
| Miscellaneous-Filing: | | | | |
| Petition: | | | | |
| Patent-Appeals-and-Interference: | | | | |
| Post-Allowance-and-Post-Issuance: | | | | |
| Utility Appl issue fee | 1501 | 1 | 1740 | 1740 |
| Publ. Fee- early, voluntary, or normal | 1504 | 1 | 300 | 300 |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
|--------------------|----------|----------|--------|----------------------|
| Extension-of-Time: | | | | |
| Miscellaneous: | | | | |
| Total in USD (\$) | | | | 2040 |

Electronic Acknowledgement Receipt

| | |
|---|--|
| EFS ID: | 13013684 |
| Application Number: | 10675566 |
| International Application Number: | |
| Confirmation Number: | 9980 |
| Title of Invention: | ARCHITECTURE FOR A FLEXIBLE AND HIGH-PERFORMANCE GATEWAY CABLE MODEM |
| First Named Inventor/Applicant Name: | Gordon Y. Li |
| Customer Number: | 94518 |
| Filer: | James Y.C. Sze |
| Filer Authorized By: | |
| Attorney Docket Number: | 348162-982350 |
| Receipt Date: | 14-JUN-2012 |
| Filing Date: | 30-SEP-2003 |
| Time Stamp: | 13:30:44 |
| Application Type: | Utility under 35 USC 111(a) |

Payment information:

| | |
|--|-----------------|
| Submitted with Payment | yes |
| Payment Type | Deposit Account |
| Payment was successfully received in RAM | \$ 2040 |
| RAM confirmation Number | 25830 |
| Deposit Account | 041679 |
| Authorized User | |

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|--------------------------|---|------------------|------------------|
| 1 | Power of Attorney | poachngcorradd.pdf | 132523 | no | 1 |
| | | | a1992b9313964323250c08f98c8f8165d6cd608f | | |
| Warnings: | | | | | |
| Information: | | | | | |
| 2 | Assignee showing of ownership per 37 CFR 3.73(b). | statement373.pdf | 191654 | no | 2 |
| | | | 8710be6dd188231249c3924d24a9807564531fb5 | | |
| Warnings: | | | | | |
| Information: | | | | | |
| 3 | Issue Fee Payment (PTO-85B) | partbfeestransmittal.pdf | 155673 | no | 1 |
| | | | a6fd5686f73c5c3f085ae7170fba06735c24920f | | |
| Warnings: | | | | | |
| Information: | | | | | |
| 4 | Fee Worksheet (SB06) | fee-info.pdf | 32257 | no | 2 |
| | | | 481a33c650a62eef485599c7fdcfaf6492dd288cf | | |
| Warnings: | | | | | |
| Information: | | | | | |
| Total Files Size (in bytes): | | | 512107 | | |
| <p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p> | | | | | |

PTO/SB/81 (01-09)

Approved for use through 11/30/2011. OMB 0651-0035

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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| | | |
|---|-------------------------------|---|
| POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS | Application Number | 10/675,566 |
| | Filing Date | September 30, 2003 |
| | First Named Inventor | Gordon Y. Li |
| | Title | Architecture for a flexible and high-perfor |
| | Art Unit | 2452 |
| | Examiner Name | Patrice L. Winder |
| | Attorney Docket Number | E5982-00282 |

I hereby revoke all previous powers of attorney given in the above-identified application.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

77561

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

| Practitioner(s) Name | Registration Number |
|----------------------|---------------------|
| | |
| | |
| | |
| | |
| | |

Please recognize or change the correspondence address for the above-identified application to:

☒ The address associated with the above-mentioned Customer Number.

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name

Address

City

State

Zip

Country

Telephone

Email

I am the:

☐ Applicant/Inventor.

OR

☒ Assignee of record of the entire interest. See 37 CFR 3.71.

Statement under 37 CFR 3.73(b) (Form PTO/SB/96) submitted herewith or filed on _____

SIGNATURE of Applicant or Assignee of Record

Signature

Date

Name

Bruce W. Greenhaus

Telephone

(858) 768-3679

Title and Company

Vice President, Entropic Communications, Inc.

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☐ *Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/SB/96 (07-09)

Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(b)Applicant/Patent Owner: ENTROPIC COMMUNICATIONS, INC.Application No./Patent No.: 10/675,566Filed/Issue Date: September 30, 2003

Titled:

ARCHITECTURE FOR A FLEXIBLE AND HIGH-PERFORMANCE GATEWAY CABLE MODEMENTROPIC COMMUNICATIONS, INC., a Corporation

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;
2. ☐ an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is _____ %); or
3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

- A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy therefore is attached.

OR

- B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Gordon Y. Li and Yoav Hebron To: Conexant Systems, Inc.

The document was recorded in the United States Patent and Trademark Office at

Reel 015024, Frame 0251, or for which a copy thereof is attached.

2. From: Brooktree Broadband Holding, Inc. To: The Bank of NY Trust Co., N.A.

The document was recorded in the United States Patent and Trademark Office at

Reel 018573, Frame 0337, or for which a copy thereof is attached.

3. From: Conexant Systems, Inc. To: Bank of NY Trust Co., N.A.

The document was recorded in the United States Patent and Trademark Office at

Reel 018711, Frame 0818, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☐ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.


Signature

6-7-12
Date
Bruce W. GreenhausVice President

Printed or Typed Name

Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

SUPPLEMENTAL STATEMENT UNDER 37 CFR 3.73(b)

Application No. 10/675,566, filed September 30, 2003

1 B Continued:

4. From: Bank of NY Mellon Trust Co., N.A. (Formerly, Bank of New York Trust Company, N.A.)
To: Conexant Systems, Inc.
Recorded at Reel 021523, Frame 0790
5. From: Bank of NY Mellon Trust Co., N.A. (Formerly, Bank of New York Trust Company, N.A.)
To: Conexant Systems, Inc.
Recorded at Reel 021523, Frame 0804
6. From: Conexant Systems, Inc.
To: NXP, B.V.
Recorded at Reel 021523, frame 0523
7. From: NXP
To: NXP Holding 1 B.V.
Recorded at 023928, Frame 0489
8. From: NXP Holding 1 B.V. and Trident Microsystems (Europe) B.V.
To: Trident Microsystems (Far East) Ltd.
Recorded at 023928, Frame 0552
9. From: Trident Microsystems, Inc. and Trident Microsystems (Far East) Ltd.
To: ENTROPIC COMMUNICATIONS, INC.
Recorded at Reel 028153, frame 0440



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
 Address: COMMISSIONER FOR PATENTS
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 www.uspto.gov

| APPLICATION NUMBER | FILING OR 371(C) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|--------------------|-----------------------|-----------------------|------------------------|
| 10/675,566 | 09/30/2003 | Gordon Y. Li | E5982-00282 |

CONFIRMATION NO. 9980**POA ACCEPTANCE LETTER**

77561

Duane Morris LLP (Entropic)
 IP Department
 30 South 17th Street
 Philadelphia, PA 19103-4196

Date Mailed: 06/19/2012

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 06/14/2012.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/nhorne/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
 United States Patent and Trademark Office
 Address: COMMISSIONER FOR PATENTS
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 www.uspto.gov

| APPLICATION NUMBER | FILING OR 371(C) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|--------------------|-----------------------|-----------------------|------------------------|
| 10/675,566 | 09/30/2003 | Gordon Y. Li | 348162-982350 |

CONFIRMATION NO. 9980**POWER OF ATTORNEY NOTICE**

94518
 DLA PIPER LLP (US)
 2000 UNIVERSITY AVENUE
 EAST PALO ALTO, CA 94303

Date Mailed: 06/19/2012

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 06/14/2012.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/nhorne/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
 United States Patent and Trademark Office
 Address: COMMISSIONER FOR PATENTS
 P. O. Box 1450
 Alexandria, Virginia 22313-1450
 www.uspto.gov

| APPLICATION NO. | ISSUE DATE | PATENT NO. | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|------------|------------|---------------------|------------------|
| 10/675,566 | 07/17/2012 | 8223775 | E5982-00282 | 9980 |

77561 7590 06/27/2012
 Duane Morris LLP (Entropic)
 IP Department
 30 South 17th Street
 Philadelphia, PA 19103-4196

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
 (application filed on or after May 29, 2000)

The Patent Term Adjustment is 2220 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Gordon Y. Li, San Diego, CA;
 Yoav Hebron, San Diego, CA;

PTO/SB/80 (11-08)

Approved for use through 11/30/2011. OMB 0851-0035

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:



Practitioners associated with the Customer Number:

23446

OR



Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

| Name | Registration Number | Name | Registration Number |
|------|---------------------|------|---------------------|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:



The address associated with Customer Number:

23446

OR

| | | | |
|--|-------|-----|--|
| <input type="checkbox"/> Firm or Individual Name | | | |
| Address | | | |
| City | State | Zip | |
| Country | | | |
| Telephone | Email | | |

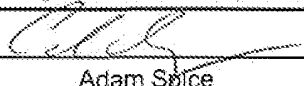
Assignee Name and Address:

Entropic Communications, LLC.
2051 Palomar Airport Road, Suite 100
Carlsbad, CA 92011

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

| | | | |
|-----------|---|-----------|---------|
| Signature |  | Date | 6/15/15 |
| Name | Adam Spice | Telephone | |
| Title | Chief Financial Officer | | |

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt

| | |
|---|--|
| EFS ID: | 23015034 |
| Application Number: | 10675566 |
| International Application Number: | |
| Confirmation Number: | 9980 |
| Title of Invention: | ARCHITECTURE FOR A FLEXIBLE AND HIGH-PERFORMANCE GATEWAY CABLE MODEM |
| First Named Inventor/Applicant Name: | Gordon Y. Li |
| Customer Number: | 77561 |
| Filer: | Christopher C. Winslade/Deb Wilson |
| Filer Authorized By: | Christopher C. Winslade |
| Attorney Docket Number: | E5982-00282 |
| Receipt Date: | 24-JUL-2015 |
| Filing Date: | 30-SEP-2003 |
| Time Stamp: | 12:52:05 |
| Application Type: | Utility under 35 USC 111(a) |

Payment information:

| | |
|------------------------|----|
| Submitted with Payment | no |
|------------------------|----|

File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|-----------------|---|---------------------------------------|--|------------------|------------------|
| 1 | Assignee showing of ownership per 37 CFR 3.73 | 29566US01_373b_Statement_s b96.pdf | 430293 eef2bb6ac2d760dc8698b5ba5763f3b4ed9 4df52 | no | 2 |

Warnings:**Information:**

| | | | | | |
|--|---|-------------------------|--|----|---|
| 2 | Assignee showing of ownership per 37 CFR 3.73 | 29566US01_SuppSheet.pdf | 19282 77f94689dbe37f89ca72754543a8844550a528a7 | no | 1 |
| Warnings: | | | | | |
| Information: | | | | | |
| 3 | Power of Attorney | Entropic_POA_PreAIA.pdf | 340881 8107f4c6d5473b527f97e45769199b81a37aad1b | no | 2 |
| Warnings: | | | | | |
| Information: | | | | | |
| Total Files Size (in bytes): | | | 790456 | | |
| <p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p> | | | | | |

STATEMENT UNDER 37 CFR 3.73(b)Applicant/Patent Owner: Gordon Y. Li, Yoav HebronApplication No./Patent No.: 8,223,775Filed/Issue Date: 07/17/2012

Titled:

ARCHITECTURE FOR A FLEXIBLE AND HIGH-PERFORMANCE GATEWAY CABLE MODEM

Entropic Communications, LLC

, a corporation

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;
2. ☐ an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is _____ %); or
3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

- A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy therefore is attached.

OR

- B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Gordon Y. Li, Yoav Hebron To: CONEXANT SYSTEMS, INC.

The document was recorded in the United States Patent and Trademark Office at

Reel 015024, Frame 0251, or for which a copy thereof is attached.

2. From: CONEXANT SYSTEMS, INC. To: NXP, B.V.

The document was recorded in the United States Patent and Trademark Office at

Reel 021531, Frame 0523, or for which a copy thereof is attached.

3. From: NXP To: NXP HOLDING 1 B.V.

The document was recorded in the United States Patent and Trademark Office at

Reel 023928, Frame 0489, or for which a copy thereof is attached.

- ☒ Additional documents in the chain of title are listed on a supplemental sheet(s).

- ☒ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Christopher C. Winslade/

07/24/2015

Signature

Date

Christopher C. Winslade, Reg. No. 36308

Attorney for Applicant

Printed or Typed Name

Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

ENTROPIC_CHARTER_0005655

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

SUPPLEMENTAL SHEET FOR USE WITH PTO/SB/96/(03-09)

STATEMENT UNDER 37 CFR 3.73(b) – SUPPLEMENTAL SHEET

4. From: TRIDENT MICROSYSTEMS (EUROPE) B.V. and NXP HOLDING 1 B.V.
To: TRIDENT MICROSYSTEMS (FAR EAST) LTD.
The document was recorded in the United States Patent and Trademark Office at Reel, 023928 Frame, 0552 or for which a copy thereof is attached.
5. From: TRIDENT MICROSYSTEMS, INC. and TRIDENT MICROSYSTEMS (FAR EAST) LTD. To: ENTROPIC COMMUNICATIONS, INC.
The document was recorded in the United States Patent and Trademark Office at Reel, 028153 Frame, 0440 or for which a copy thereof is attached.
6. From: EXCALIBUR ACQUISITION CORPORATION and ENTROPIC COMMUNICATIONS, INC. To: ENTROPIC COMMUNICATIONS, INC.
The document was recorded in the United States Patent and Trademark Office at Reel, 035706 Frame, 0267 or for which a copy thereof is attached.
7. From: ENTROPIC COMMUNICATIONS, INC. and EXCALIBUR SUBSIDIARY, LLC To: ENTROPIC COMMUNICATIONS, LLC
The document was recorded in the United States Patent and Trademark Office at Reel, 035717 Frame, 0628 or for which a copy thereof is attached.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
 United States Patent and Trademark Office
 Address: COMMISSIONER FOR PATENTS
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 www.uspto.gov

| APPLICATION NUMBER | FILING OR 371(C) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|--------------------|-----------------------|-----------------------|------------------------|
| 10/675,566 | 09/30/2003 | Gordon Y. Li | E5982-00282 |

CONFIRMATION NO. 9980**POA ACCEPTANCE LETTER**

23446

MCANDREWS HELD & MALLOY, LTD
 500 WEST MADISON STREET
 SUITE 3400
 CHICAGO, IL 60661



Date Mailed: 08/05/2015

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/24/2015.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/mmasfaw/



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
 Address: COMMISSIONER FOR PATENTS
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 www.uspto.gov

| APPLICATION NUMBER | FILING OR 371(C) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|--------------------|-----------------------|-----------------------|------------------------|
| 10/675,566 | 09/30/2003 | Gordon Y. Li | E5982-00282 |

CONFIRMATION NO. 9980**POWER OF ATTORNEY NOTICE**

OC000000076660714

77561

Duane Morris LLP (Entropic)
 IP Department
 30 South 17th Street
 Philadelphia, PA 19103-4196

Date Mailed: 08/05/2015

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/24/2015.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/mmasfaw/

To: mhmpato@mcandrews-ip.com,,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 23446

Aug 05, 2015 05:33:05 AM

Dear PAIR Customer:

MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661
UNITED STATES

The following USPTO patent application(s) associated with your Customer Number, 23446 , have new outgoing correspondence. This correspondence is now available for viewing in Private PAIR.

The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

Disclaimer:

The list of documents shown below is provided as a courtesy and is not part of the official file wrapper. The content of the images shown in PAIR is the official record.

| Application | Document | Mailroom Date | Attorney Docket No. |
|-------------|----------|---------------|---------------------|
| 10675566 | N570 | 08/05/2015 | E5982-00282 |
| | N570 | 08/05/2015 | E5982-00282 |

To view your correspondence online or update your email addresses, please visit us anytime at <https://sportal.uspto.gov/secure/myportal/privatepair>.

If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov with 'e-Office Action' on the subject line or call 1-866-217-9197 during the following hours:

Monday - Friday 6:00 a.m. to 12:00 a.m.

Thank you for prompt attention to this notice,

UNITED STATES PATENT AND TRADEMARK OFFICE
PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

PTO/AIA/80 (07-17)

Approved for use through 03/31/2021. OMB 0651-0035

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no person is required to respond to a collection of information unless it displays a valid OMB control number

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

☒ Practitioners associated with Customer Number: 23,446

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

| Name | Registration Number |
|------|---------------------|
| | |
| | |
| | |
| | |
| | |
| | |

| Name | Registration Number |
|------|---------------------|
| | |
| | |
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| | |

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

☒ The address associated with Customer Number: 23,446

OR

| | | | |
|--------------------------|-------------------------|-------|-----|
| <input type="checkbox"/> | Firm or individual name | | |
| | Address | | |
| | City | State | Zip |
| | Country | | |
| | Telephone | Email | |

Assignee name and address: ENTROPIC COMMUNICATIONS, LLC
1345 AVENUE OF THE AMERICAS, 46TH FLOOR
NEW YORK, NY 10105

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of the practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee.

| | |
|--|------------------------|
| Signature /Andrea L. Gothing/ | Date 2021-05-04 |
| Name Andrea L. Gothing | Telephone 415-830-0613 |
| Title Licensing Officer and Authorized Signatory, Entropic Communications, LLC | |

This collection of information is required by 37 CFR 1.31, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public, which is to update (and by the USPTO to process) the file of a patent or reexamination proceeding. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 18 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt

| | |
|---|--|
| EFS ID: | 43333150 |
| Application Number: | 10675566 |
| International Application Number: | |
| Confirmation Number: | 9980 |
| Title of Invention: | ARCHITECTURE FOR A FLEXIBLE AND HIGH-PERFORMANCE GATEWAY CABLE MODEM |
| First Named Inventor/Applicant Name: | Gordon Y. Li |
| Customer Number: | 23446 |
| Filer: | Ronald H. Spuhler/Deborah Wilson |
| Filer Authorized By: | Ronald H. Spuhler |
| Attorney Docket Number: | 29566US01 |
| Receipt Date: | 23-JUL-2021 |
| Filing Date: | 30-SEP-2003 |
| Time Stamp: | 16:16:33 |
| Application Type: | Utility under 35 USC 111(a) |

Payment information:

| | |
|------------------------|----|
| Submitted with Payment | no |
|------------------------|----|

File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|-----------------|---|---|--|------------------|------------------|
| 1 | Assignee showing of ownership per 37 CFR 3.73 | 29566US01_373c_Statement_A IA-96.pdf | 126514 b28a0b4ad7460082b63a61d73ca6aa8b7fbf092f | no | 3 |

Warnings:

| | | | | | |
|---|---|--|--|----|---|
| Information: | | | | | |
| 2 | Assignee showing of ownership per 37 CFR 3.73 | 29566US01_3-73-statement-supplemental-sheet.pdf | 18951 5b2f8879153a6be06233cb3d778d074ab050f667 | no | 1 |
| Warnings: | | | | | |
| Information: | | | | | |
| 3 | Power of Attorney | Entropic-POA_General_Assignee_EntropicCommunications_ALG.pdf | 487892 51444e06ae84b241bfc127dc47c5d6c646944dd7 | no | 2 |
| Warnings: | | | | | |
| Information: | | | | | |
| Total Files Size (in bytes): | | | 633357 | | |
| <p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p> | | | | | |

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(c)Applicant/Patent Owner: ENTROPIC COMMUNICATIONS, LLCApplication No./Patent No.: 10/675,566Filed/Issue Date: 2003-09-30Titled: ARCHITECTURE FOR A FLEXIBLE AND HIGH-PERFORMANCE GATEWAY CABLE MODEMENTROPIC COMMUNICATIONS, LLC, a limited liability company

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☒ The assignee of the entire right, title, and interest.
2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):
- ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.
- ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

- A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.
- B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:
1. From: Gordon Y. Li, Yoav Hebron To: CONEXANT SYSTEMS, INC.
- The document was recorded in the United States Patent and Trademark Office at Reel 015024, Frame 0251, or for which a copy thereof is attached.
2. From: CONEXANT SYSTEMS, INC. To: NXP, B.V.
- The document was recorded in the United States Patent and Trademark Office at Reel 021531, Frame 0523, or for which a copy thereof is attached.

[Page 1 of 2]

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

STATEMENT UNDER 37 CFR 3.73(c)

3. From: NXP, B.V. To: NXP HOLDING 1 B.V.

The document was recorded in the United States Patent and Trademark Office at
Reel 023928, Frame 0489, or for which a copy thereof is attached.

4. From: TRIDENT MICROSYSTEMS (EUROPE) B.V., NXP HOLDING 1 B.V. To: TRIDENT MICROSYSTEMS (FAR EAST) LTD.

The document was recorded in the United States Patent and Trademark Office at
Reel 023928, Frame 0552, or for which a copy thereof is attached.

5. From: TRIDENT MICROSYSTEMS, INC., TRIDENT MICROSYSTEMS (FAR EAST) LTD. To: ENTROPIC COMMUNICATIONS, INC.

The document was recorded in the United States Patent and Trademark Office at
Reel 028153, Frame 0440, or for which a copy thereof is attached.

6. From: EXCALIBUR ACQUISITION CORPORATION, ENTROPIC COMMUNICATIONS, INC. To: ENTROPIC COMMUNICATIONS, INC.

The document was recorded in the United States Patent and Trademark Office at
Reel 035706, Frame 0267, or for which a copy thereof is attached.

☒ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Ronald H. Spuhler/

2021-07-23

Signature

Date

Ronald H. Spuhler

52245

Printed or Typed Name

Title or Registration Number

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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

STATEMENT UNDER 37 CFR 3.73(c) -- Supplemental Sheet

Applicant/Patent Owner: ENTROPIC COMMUNICATIONS, LLC

Application No./Patent No.: 10/675,566 Filed/Issue Date: 2003-09-30

Titled: ARCHITECTURE FOR A FLEXIBLE AND HIGH-PERFORMANCE GATEWAY CABLE MODEM

Assignee: ENTROPIC COMMUNICATIONS, LLC, a limited liability company

7. From ENTROPIC COMMUNICATIONS, INC., EXCALIBUR SUBSIDIARY, LLC

To: ENTROPIC COMMUNICATIONS, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 035717, Frame 0628, or for which a copy thereof is attached.

8. From ENTROPIC COMMUNICATIONS LLC To: MAXLINEAR COMMUNICATIONS LLC

The document was recorded in the United States Patent and Trademark Office at
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9. From MAXLINEAR COMMUNICATIONS LLC To: ENTROPIC COMMUNICATIONS, LLC

The document was recorded in the United States Patent and Trademark Office at
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The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

[RONALD H. SPUHLER]

/Ronald H. Spuhler/

Dated: 2021-07-23

Reg. No. 52245



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|--------------------|-----------------------|-----------------------|------------------------|
| 10/675,566 | 09/30/2003 | Gordon Y. Li | |

23446
 MCANDREWS HELD & MALLOY, LTD
 500 WEST MADISON STREET
 SUITE 3400
 CHICAGO, IL 60661

CONFIRMATION NO. 9980
POA ACCEPTANCE LETTER



Date Mailed: 07/29/2021

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/23/2021.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/sharris/



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| APPLICATION NUMBER | FILING OR 371(C) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|--------------------|-----------------------|-----------------------|------------------------|
| 10/675,566 | 09/30/2003 | Gordon Y. Li | 29566US01 |

CONFIRMATION NO. 9980

POWER OF ATTORNEY NOTICE



23446
 MCANDREWS HELD & MALLOY, LTD
 500 WEST MADISON STREET
 SUITE 3400
 CHICAGO, IL 60661

Date Mailed: 07/29/2021

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/23/2021.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

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/sharris/

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Jul 29, 2021 03:59:59 AM

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| Application | Document | Mailroom Date | Attorney Docket No. |
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| 10675566 | N570 | 07/29/2021 | |
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|---|--------------------------------|--|
| DOCKET NO. 2:22-cv-125 | DATE FILED 4/27/2022 | U.S. DISTRICT COURT Eastern District of Texas |
| PLAINTIFF ENTROPIC COMMUNICATIONS, LLC | | DEFENDANT CHARTER COMMUNICATIONS, INC., ET AL |
| PATENT OR TRADEMARK NO. | DATE OF PATENT OR TRADEMARK | HOLDER OF PATENT OR TRADEMARK |
| 1 8,223,775 | 7/17/2012 | Entropic Communications, LLC |
| 2 8,284,690 | 10/9/2012 | Entropic Communications, LLC |
| 3 8,792,008 | 7/29/2014 | Entropic Communications, LLC |
| 4 9,210,362 | 12/8/2015 | Entropic Communications, LLC |
| 5 9,825,826 | 11/21/2017 | Entropic Communications, LLC |

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

| | | | |
|----------------------------|---|-------------------------------|--|
| DATE INCLUDED | INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading | | |
| PATENT OR TRADEMARK NO. | DATE OF PATENT OR TRADEMARK | HOLDER OF PATENT OR TRADEMARK | |
| 1 | | | |
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| 4 | | | |
| 5 | | | |

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| | | |
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☐ Trademarks or ☒ Patents. (☐ the patent action involves 35 U.S.C. § 292.);

| | | |
|---|--------------------------------|--|
| DOCKET NO. 2:22-cv-125 | DATE FILED 4/27/2022 | U.S. DISTRICT COURT Eastern District of Texas |
| PLAINTIFF ENTROPIC COMMUNICATIONS, LLC | | DEFENDANT CHARTER COMMUNICATIONS, INC., ET AL |
| PATENT OR TRADEMARK NO. | DATE OF PATENT OR TRADEMARK | HOLDER OF PATENT OR TRADEMARK |
| 1 10,135,682 | 11/20/2018 | Entropic Communications, LLC |
| 2 | | |
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

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| PATENT OR TRADEMARK NO. | DATE OF PATENT OR TRADEMARK | HOLDER OF PATENT OR TRADEMARK | |
| 1 | | | |
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| DECISION/JUDGEMENT |
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EXHIBIT C



(19) **United States**

(12) **Patent Application Publication**

Brooks et al.

(10) Pub. No.: **US 2001/0039600 A1**

(43) Pub. Date: **Nov. 8, 2001**

(54) **CABLE MODEM HAVING A PROGRAMMABLE MEDIA ACCESS CONTROLLER**

(76) Inventors: **John M. Brooks**, Niwot, CO (US);
Brett A. Bernath, San Diego, CA (US)

Correspondence Address:
AKIN GUMP STRAUSS HAUER & FELD
1900 FROST BANK PLAZA
816 CONGRESS AVENUE
AUSTIN, TX 78701

(21) Appl. No.: **09/785,035**
(22) Filed: **Feb. 16, 2001**

Related U.S. Application Data

(63) Non-provisional of provisional application No. 60/183,130, filed on Feb. 17, 2000.

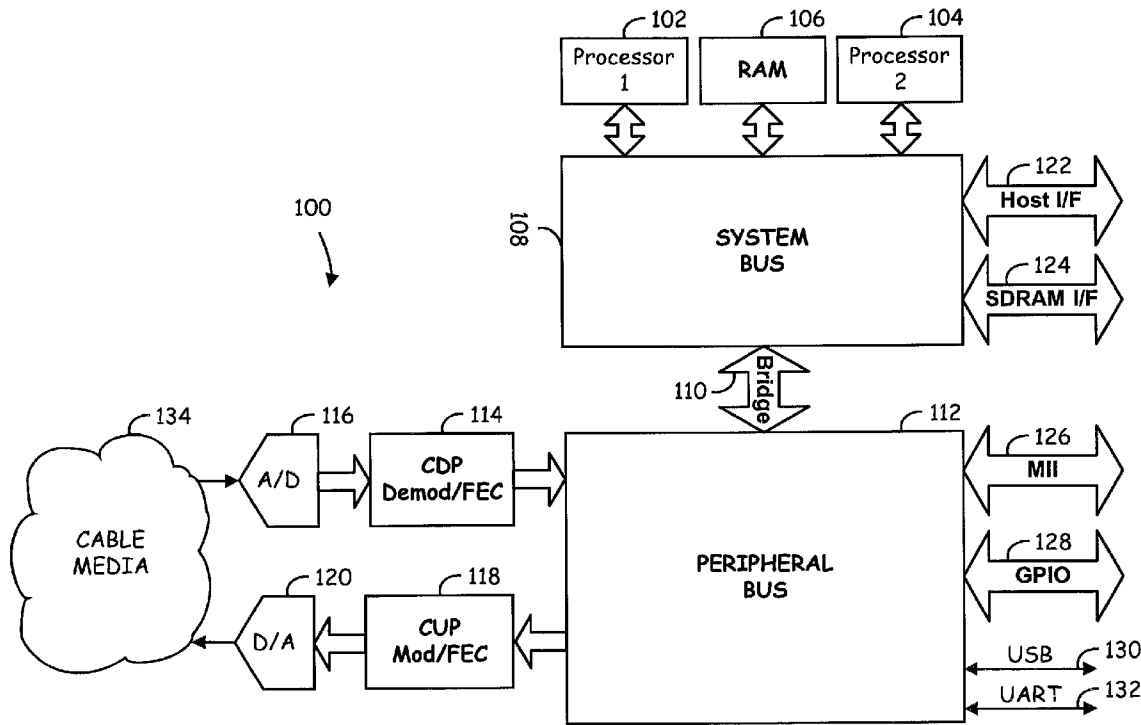
Publication Classification

(51) **Int. Cl.⁷** **G06F 13/38; G06F 13/40**

(52) **U.S. Cl.** **710/126**

(57) **ABSTRACT**

A cable modem having a programmable media access controller (MAC). A single cable modem device includes all necessary MAC functions. The invention allows programmable MAC functions to support evolving standards (e.g., DOCSIS) without requiring expensive hardware upgrades. Bifurcated microprocessor architecture, in which first processing circuitry is programmed to implement MAC functionality for processing information flowing to and from cable media interface circuitry, and second embedded processor core or host system processor provides operating system functionality are used. Alternatively, separate processor cores provide MAC functionality for downstream and upstream data paths, respectively. Cable media interface circuitry, and other peripheral circuitry, are coupled to a peripheral bus that is linked by a bridge circuit to a system bus. The processing circuitry MAC is communicatively coupled to the system bus. Centralized DMA control directs data transfer between the peripheral and system buses as determined, at least in part, by the programmable MAC.



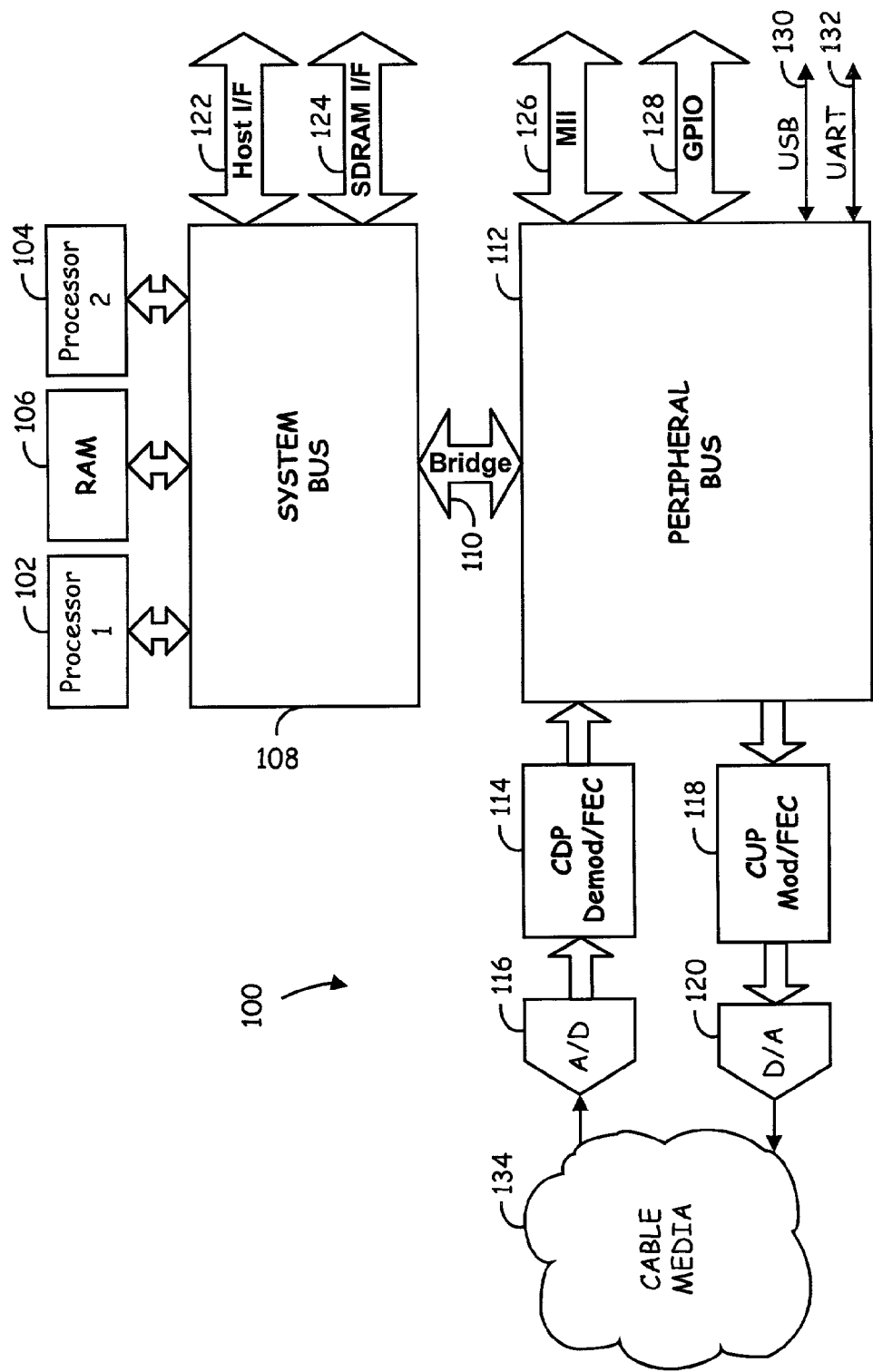


Fig. 1

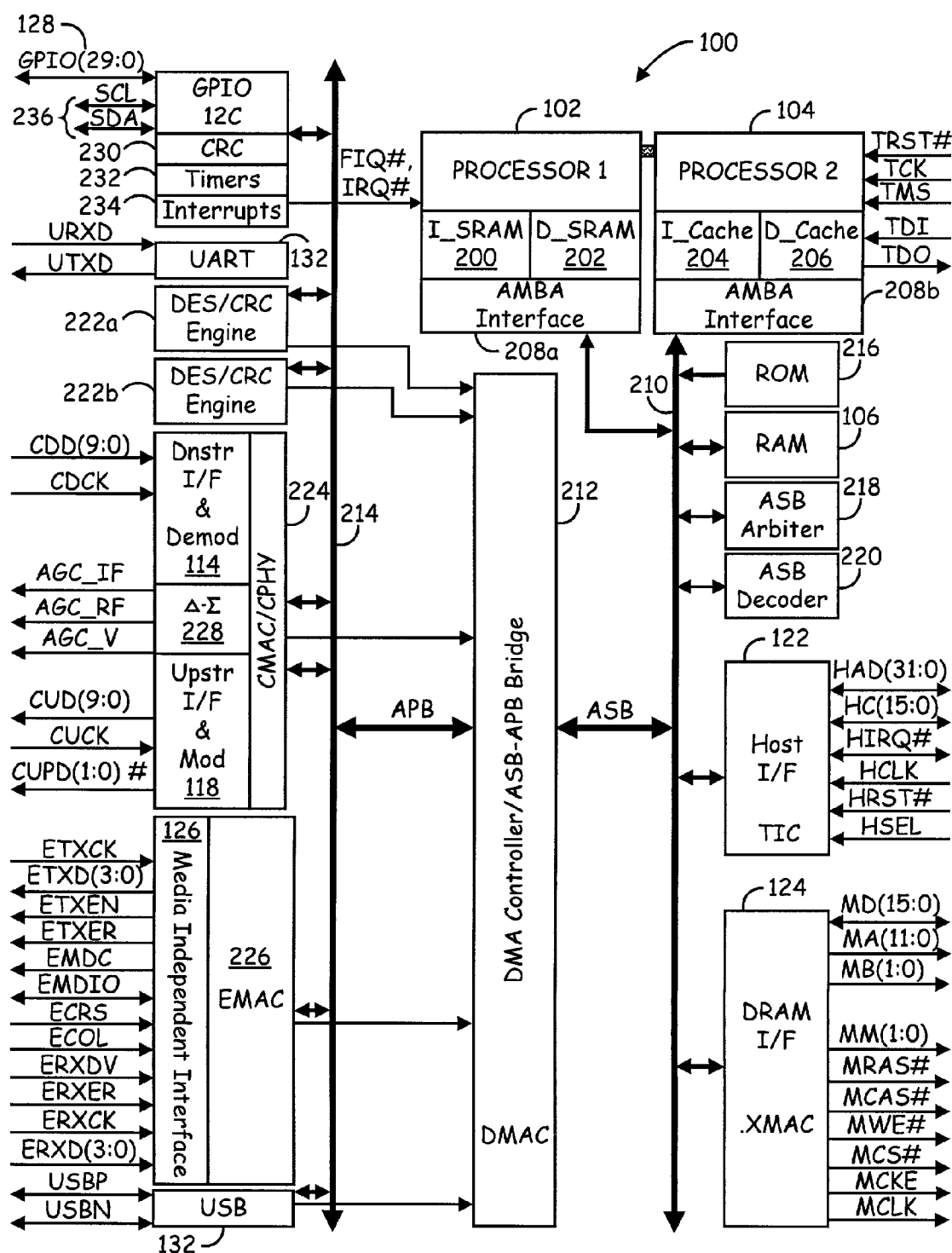


Fig. 2

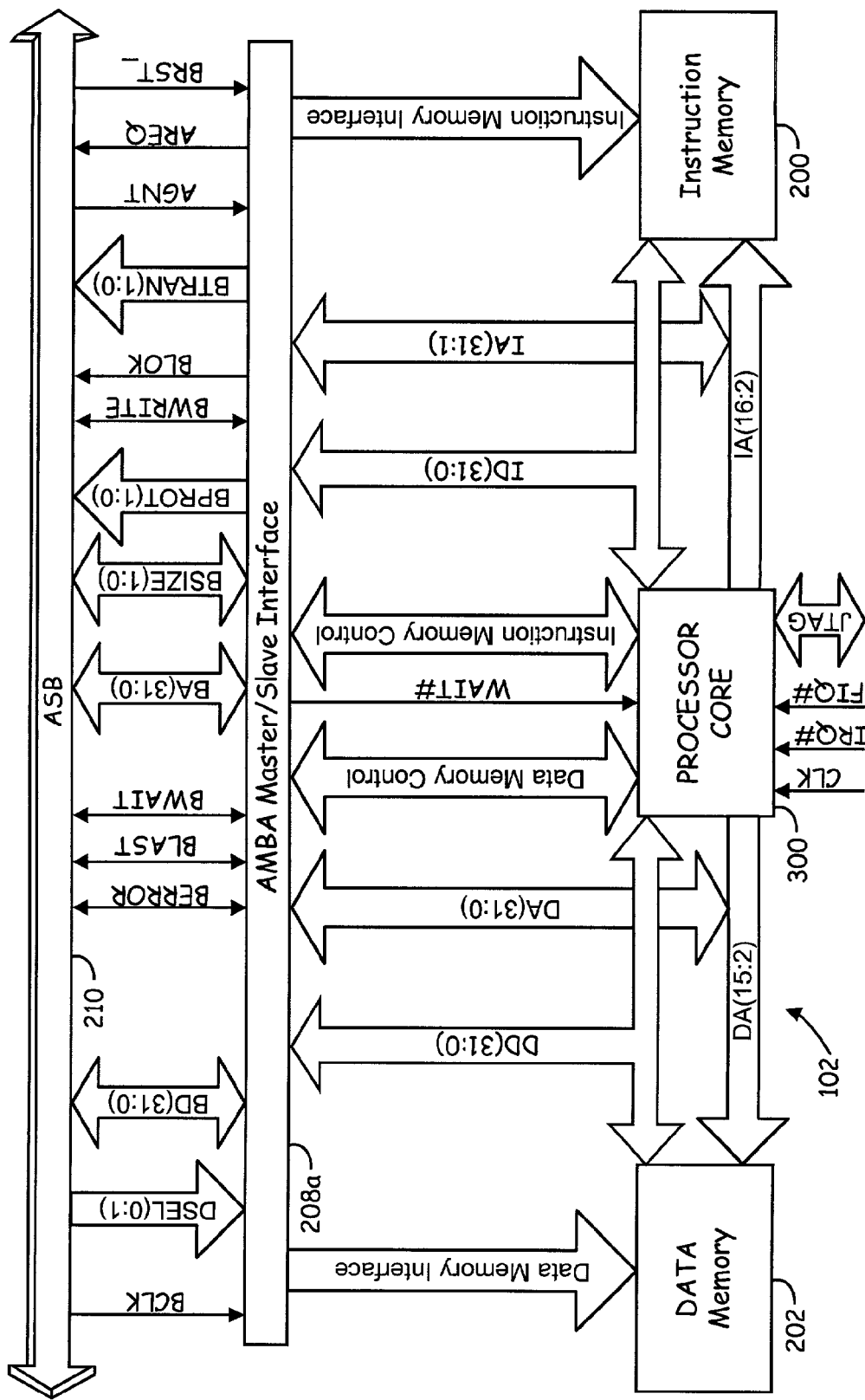


Fig. 3

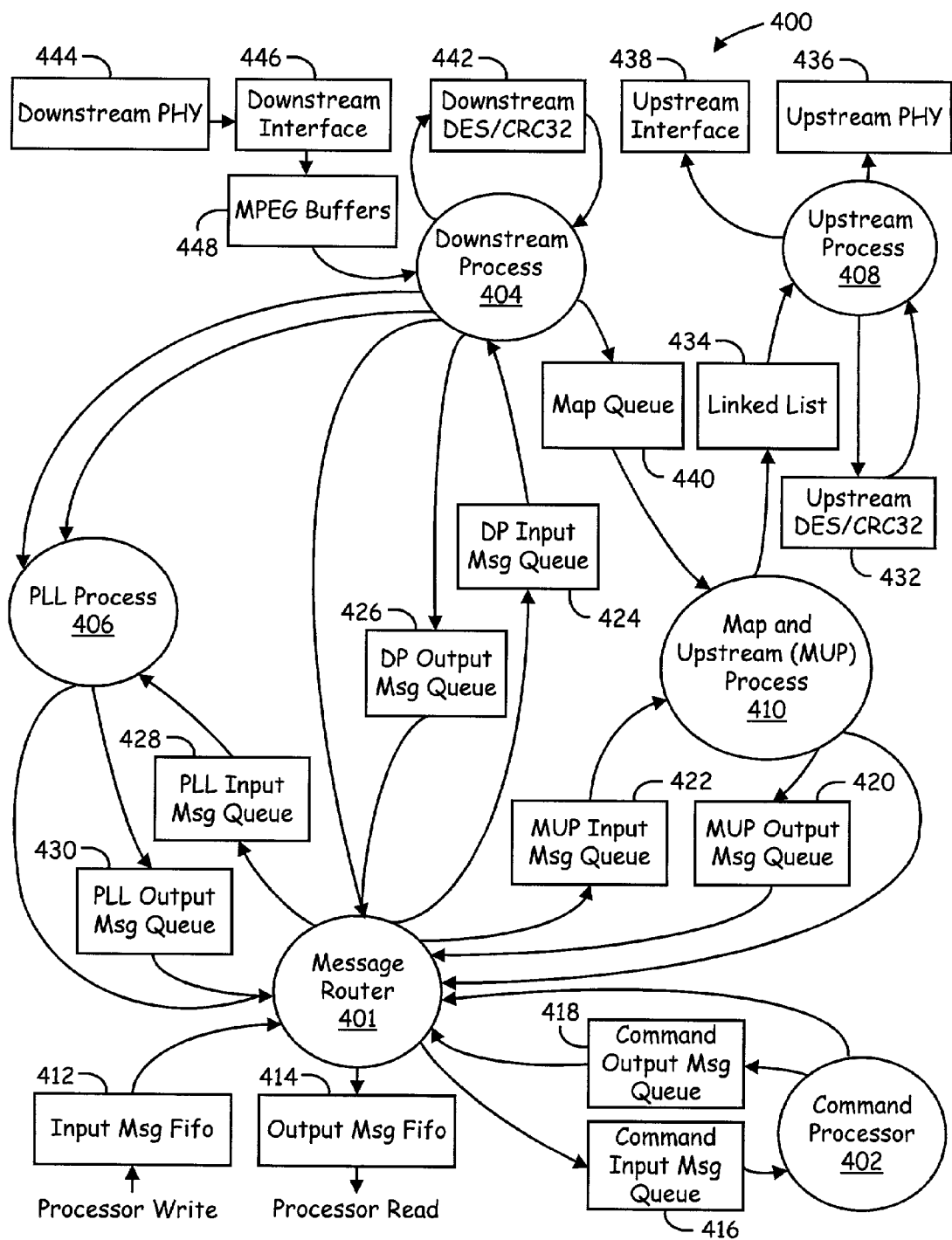


Fig. 4

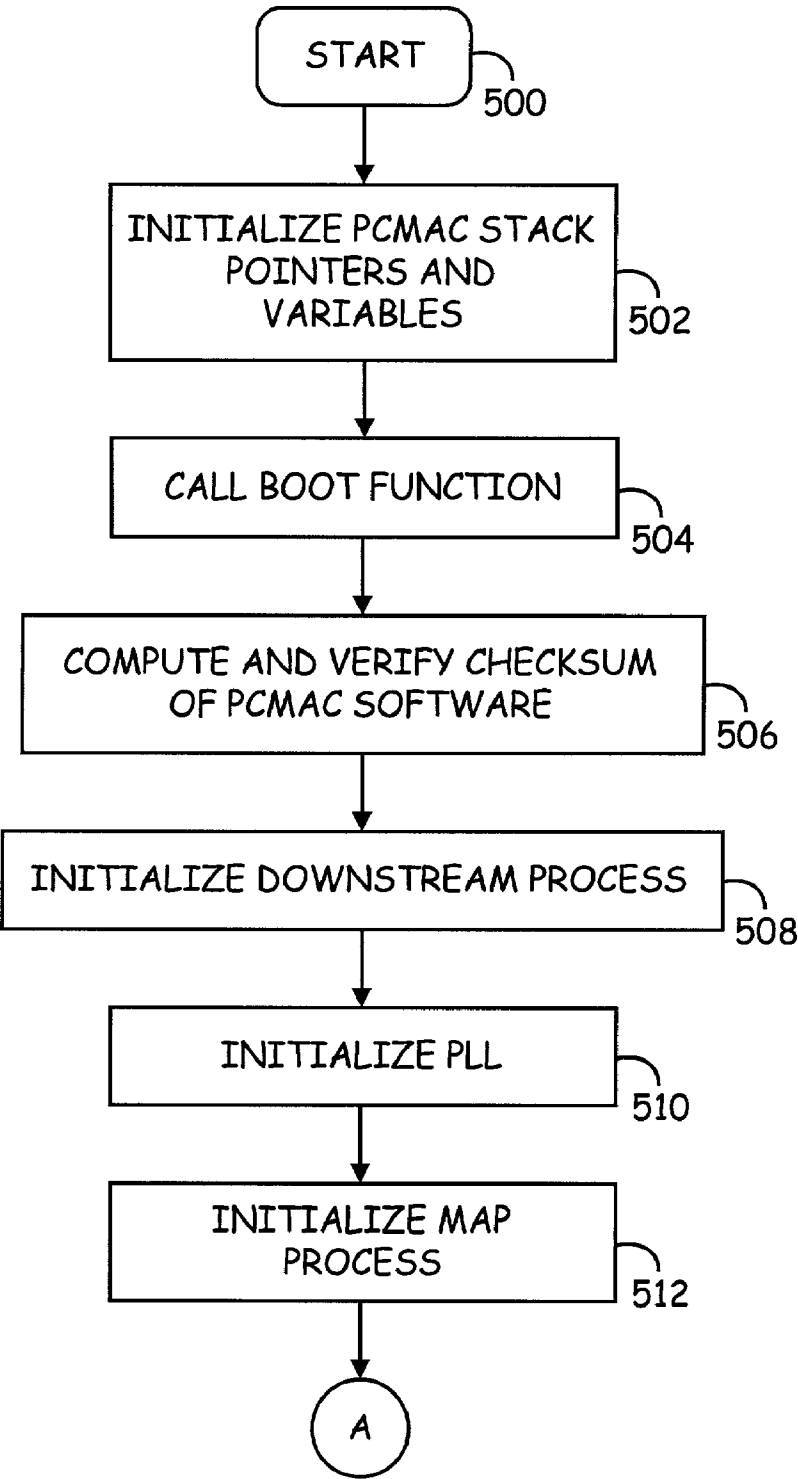


Fig. 5A

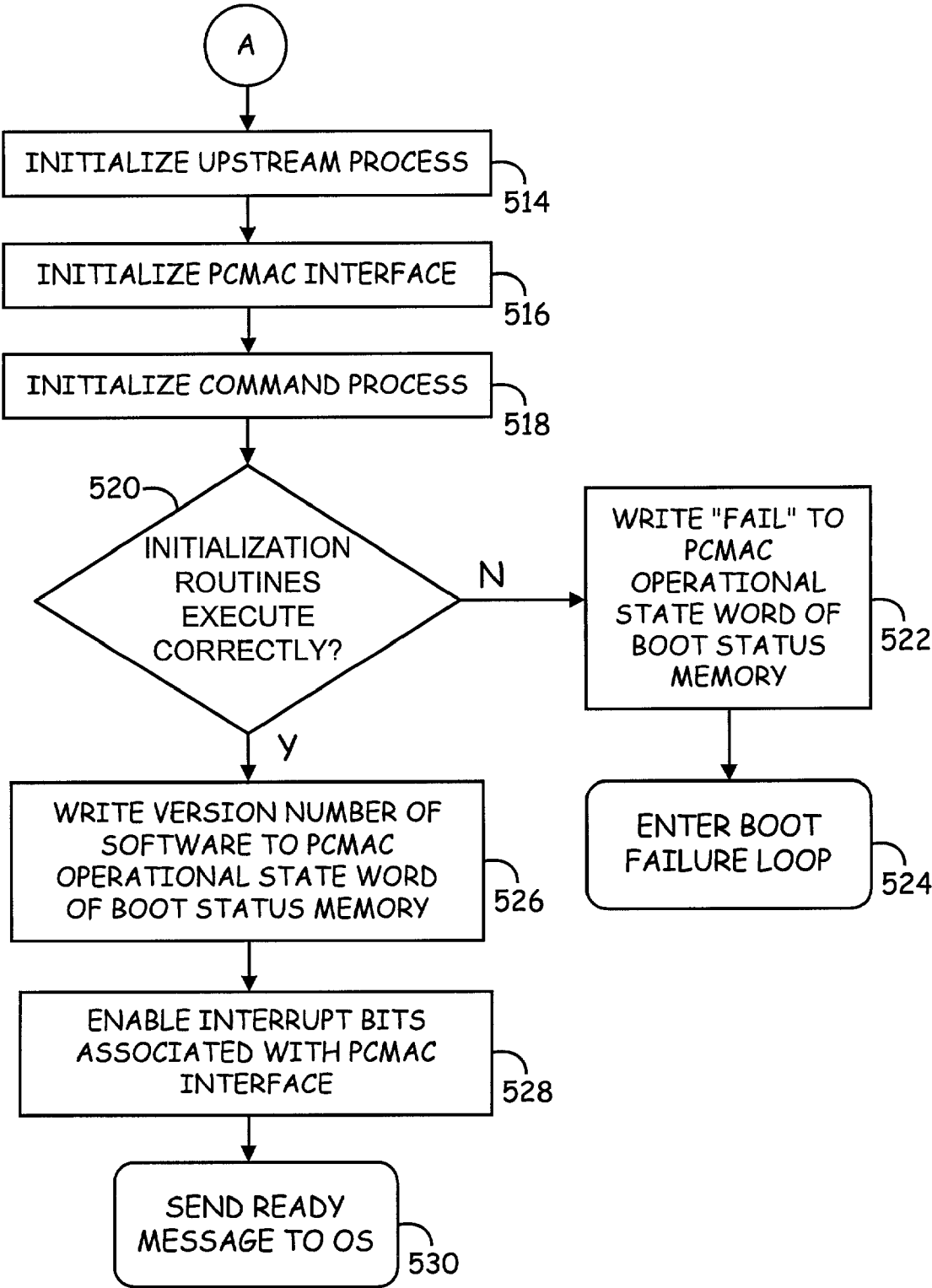


Fig. 5B

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CABLE MODEM HAVING A PROGRAMMABLE MEDIA ACCESS CONTROLLER

BACKGROUND

[0001] 1. Technical Field

[0002] The present invention relates generally to a cable modem; and, more particularly, it relates to a cable modem having a programmable media access controller.

[0003] 2. Related Art

[0004] In recent years, cable television networks have become more widespread. A typical cable TV system can carry many television stations, and is effectively a high bandwidth system. Because of the increasing availability of cable television infrastructure, the use of television cables as the medium for computer data networks has the potential for giving users high bandwidth at a reasonable cost. A cable TV system, however, requires several enhancements in order to function as a data network.

[0005] In its classic form, a cable TV system carries information in only one direction—from the cable system headend to the individual user. The user interface to the system generally comprises a receiver such as a television or a stereo. The headend transmits television or stereo channels simultaneously. In general, the user has no influence on what is transmitted and can only choose among the channels the headend is transmitting.

[0006] In contrast, a data network carries data from the headend to the user (the downstream path) and from the user to the headend (the upstream path). The individual user requires equipment, such as a cable modem, that can both receive from the headend and transmit to it. A cable data network must be able to handle many individual users simultaneously, each of whom have control over what they receive and transmit.

[0007] Cable modems offer greatly improved bandwidth capable of delivering services hundreds, or even thousands, of times faster than conventional modems. Cable modems can achieve data-transfer rates of up to 40 Mbits/s by connecting directly to coaxial lines as opposed to dial-in modems, that use twisted-pair copper telephone lines.

[0008] In order for a cable TV network to operate as a data network, it requires a headend capable of both transmitting and receiving data. To ensure that each user receives the data they require, a network protocol must be implemented to allow independent users of the network to utilize the shared headend and the distribution network without interference from or receiving the data of other users.

[0009] The network protocol places requirements on both the headend and the user end. Generally, the headend serves as the network controller, and the user's cable modem must be able to respond to commands from the headend. In cable modems adhering to the well-known OSI reference model, the lowest layer is the Physical layer (PHY), while the next layer up is the Data Link layer. The Data Link layer is segmented into two parts, the Medium Access Controller (MAC), which interfaces with the PHY, and the Logical Link Control (LLC), which interfaces to the MAC and to higher layers. In general, the MAC and LLC provide the following Data Link functionality: transmit and receive data encapsulation, including framing (frame boundary delimi-

tation, frame synchronization), addressing (management of source and destination address), and error detection (detection of physical medium transmission errors); and media access management, including collision avoidance and handling. A physical address or MAC address is a unique Data Link layer address that is assigned to every port or device that connects to a network. Other devices in the network use these addresses to locate specific ports in the network and to create and update routing tables and data structures.

[0010] In an effort to coordinate the development of multimedia high-speed data services and the interoperability of network devices, cable operators have formed the Multimedia Cable Network Systems (MCNS) Group in cooperation with the industry research and development consortium CableLabs. The MCNS group has promulgated the Data Over Cable Service Interface Specification (DOCSIS). Other standards, such as DAVIC/DVB have likewise been created. Such standards continue to evolve over time, with the frequent inclusion of additional feature sets.

[0011] Previously, integrated cable modem devices have only included physical-layer functions and a fixed-function MAC. These devices are generally compliant with a single specification or a version of a specification. Thus, any changes to the underlying specification require hardware modifications for the MAC to be compliant, resulting in lengthy and expensive product development cycles.

[0012] Further limitations and disadvantages of conventional and traditional systems will become apparent to one of skill in the art through comparison of such systems with the present invention as set forth in the remainder of the present application with reference to the drawings.

SUMMARY OF THE INVENTION

[0013] Briefly, the present invention relates to a cable modem having a programmable media access controller (MAC). In one embodiment of the invention, a single cable modem device is provided that includes all necessary MAC functions. The cable modem device advantageously allows the MAC functions to be programmed to support evolving standards (e.g., DOCSIS) without requiring expensive hardware upgrades. The cable modem device may also include data-conversion components, a complete PHY that is compliant with both United States and European standards, an Ethernet MAC, a Universal Serial Bus (USB) transceiver, an encryption engine(s), key memory components and other peripheral functions.

[0014] The cable modem device of a disclosed embodiment of the invention utilizes a bifurcated microprocessor architecture in which first processing circuitry (e.g., an embedded processor core) is programmed to implement the desired MAC functionality for processing information flowing to and from cable media interface circuits. A second embedded processor core or host system processor provides operating system functionality and controls the boot process for the first embedded processor core. In a further embodiment, separate processor cores are provided for implementing MAC functionality for the downstream and upstream data paths, respectively. The embedded microprocessor cores may be Advanced RISC Machines (ARM) microprocessors or any other suitable microprocessor cores.

[0015] In a disclosed embodiment of the invention, cable media interface circuitry, as well as other peripheral cir-

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cuitry, are coupled to a peripheral bus. The peripheral bus is linked by a bridge circuit to a system bus. The processing circuitry of the programmable MAC is communicatively coupled to the system bus. A novel centralized DMA controller is provided to direct transfer of data between the peripheral bus and the system bus as determined, at least in part, by the programmable MAC.

[0016] A cable modem device having a programmable MAC according to the present invention provides a software upgrade path to permit support for new versions of standards as they are adapted. Further, the programmable nature of the cable modem device permits individual manufacturers to differentiate products at the MAC layer without having to modify or replace hardware.

[0017] Other aspects, advantages and novel features of the present invention will become apparent from the following detailed description of the invention when considered in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] A better understanding of the present invention can be obtained when the following detailed description of various exemplary embodiments is considered in conjunction with the following drawings:

[0019] FIG. 1 is a block diagram of an exemplary cable modem device having a programmable cable media access controller according to the present invention;

[0020] FIG. 2 is a schematic block diagram providing exemplary details of the cable modem device of FIG. 1;

[0021] FIG. 3 is a schematic block diagram providing exemplary details of processing circuitry of FIG. 1 capable of being programmed to implement media access controller functionality in accordance with the present invention;

[0022] FIG. 4 is a state diagram providing details of an exemplary programmable cable media access controller software architecture implemented by the cable modem device of FIG. 1; and

[0023] FIGS. 5A and 5B are flow diagrams of an exemplary boot process for a programmable cable media access controller according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0024] FIG. 1 is a block diagram of an exemplary cable modem device 100 having a programmable cable media access controller (hereinafter referred to as a programmable MAC) in accordance with the present invention. The cable modem device 100 permits MAC functions to be programmed to support evolving standards, such as DOCSIS, without concomitant hardware upgrades. The disclosed circuitry may be part of a single integrated circuit, or a combination of integrated circuits. Alternatively, host system circuitry may be leveraged to perform certain of the functions described below.

[0025] The cable modem device 100 can be implemented in a variety of products, including external or internal cable modems with Ethernet and/or USB connections, multifunction home-networking products, interactive set-top-box solutions, digital satellite receivers, wireless networking

devices having antennas, Small Office/Home Office (SOHO) equipment and Internet Protocol (IP) telephony products. Accordingly, various embodiments of the invention may interface with non-traditional "cable" media (e.g., any type of media capable of transporting MPEG packets), and the precise nature of the data transmission media is not considered critical to the invention. The cable modem device 100 may be compliant with any of a number of standards, including but not limited to, DOCSIS, DAVIC/DVB (Digital Video Broadcasting) and Voice Over IP (VOIP) standards. In the case of DOCSIS, typical MAC functionality includes MPEG and MCNS decoding and frame synchronization.

[0026] In the cable modem device 100 of FIG. 1, a first processor 102 is programmed to implement the desired MAC functionality, while a second processor 104 provides operating system support. The first processor 102 of the disclosed embodiment is designed for high performance data processing. In addition to executing an operating system, the second processor 104 may manage some message processing and scheduling. The second processor 104 preferably utilizes a real-time operating system, such as VxWorks®.

[0027] Data passed between the first and second processors 102 and 104 and other components of the cable modem device 100 may be stored in random access memory (RAM) 106. The RAM 106, as well as the first and second processors 102 and 104, are communicatively coupled to a system bus 108. The system bus 108 is linked to a peripheral bus 112 via a bridge 110.

[0028] Bi-directional communication between the cable modem device 100 and cable media 134 is conducted by physical layer devices coupled to the peripheral bus 112. More particularly, downstream data communicated from the cable media 134 is received by analog-to-digital conversion circuitry 116. The digital output of the analog-to-digital circuitry 116 is provided to a cable downstream PHY circuitry 114 that performs demodulation and forward error correction functions. The output of the cable downstream PHY circuitry 114 is provided to peripheral bus 112 for processing by the programmable MAC.

[0029] Upstream data to be communicated to the cable media 134 is provided from the peripheral bus 112 to cable upstream PHY circuitry 118 that modulates the upstream data, and may also perform error correction operations. The output of the cable upstream PHY circuitry 118 is communicated to a digital-to-analog converter 120 for provision to the cable media 134.

[0030] The cable modem device 100 of FIG. 1 may also include a number of optional interfaces for communicating with a host system or external devices. For example, a host interface 122 and expansion memory interface 124 may be coupled to the system bus 108. Likewise, the peripheral bus 112 may support a Media Independent Interface (MII) 126, a General Purpose Input/Output (GPIO) interface 128, a USB port 130, and a UART port 132. As will be appreciated, many other types of interfaces may be provided, and the precise nature of supported devices is not considered critical to the invention.

[0031] Various alternate embodiments of the cable modem device 100 are contemplated. For example, the programmable MAC could be implemented by a pair of processors, with the upstream code handled by one processor and the

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downstream code handled by another processor. Such a configuration may provide advantages in terms of software partitioning.

[0032] FIG. 2 is a schematic block diagram providing exemplary details of the cable modem device **100** of FIG. 1. In this embodiment of the invention, the cable modem device **100** utilizes the Advanced System Bus (ASB **210**) and Advanced Peripheral Bus (APB **214**) protocol and bus architecture as specified in the Advanced Microcontroller Bus Architecture (AMBA) specification. The AMBA specification defines an on-chip communication standard for designing high-performance embedded microcontrollers. The ASB **210** is generally utilized for high-performance system modules, supporting the efficient connection of processors, on-chip memories, and off-chip external memory interfaces with low-power peripheral/macrocell functions. The APB **214** is generally utilized with low-power peripherals, and is optimized for minimal power consumption and reduced interface complexity in supporting peripheral functions.

[0033] Another bus defined by the AMBA specification is the Advanced High-Performance Bus (AHB). The AHB is generally utilized with high-performance, high-frequency system modules. The AHB may act as the high-performance system backbone bus, and supports the efficient connection of processors, on-chip memories, and off-chip external memory interfaces with low-power peripheral macrocell functions.

[0034] In the disclosed embodiment of the invention, the ASB **210** is utilized as the system bus **108**, although it is contemplated that other buses such as the AHB may also be used. The ASB **210** is the bus on which the first and second processors **102** and **104**, RAM memory **106**, and other direct memory access (DMA) devices reside. The ASB **210** provides a high-bandwidth interface between the system elements that are involved in the majority of data transfers. An ASB-APB bridge/centralized DMA controller **212** is provided for linking the ASB **210** to the lower bandwidth APB **214**, where most of the peripheral devices in the cable modem device **100** are located. As discussed in greater detail below, the ASB-APB bridge/centralized DMA controller **212** is both an ASB **210** master and an APB **214** master, and utilizes burst transfers and pipelining of data to optimize bus efficiency.

[0035] The APB **214** provides the basic peripheral macrocell communications infrastructure. Such peripherals typically have interfaces which are memory-mapped registers, have few high-bandwidth interfaces, and are accessed under program control (such as the programmable MAC). In the disclosed embodiment of the invention, certain performance enhancements have been made to the APB and ASB, as well as the device interfaces to these buses, as set forth in greater detail in previously incorporated patent applications entitled, "System and Method for Providing an Improved Synchronous Operation of an Advanced Peripheral Bus with Backward Compatibility", and "Asynchronous Centralized Multi-Channel DMA Controller".

[0036] Although the disclosed cable modem device **100** utilizes the AMBA bus architecture, in a broader implementation the programmable MAC may be configured to operate with a wide variety of buses and interface with any type of peripheral device. For example, in a host processor-based

implementation, the ASB **210** may be replaced with a PCI bus or other type of bus typically found in computer systems.

[0037] In this embodiment of the invention, the first processor **102** includes a microprocessor macrocell providing a high-performance integer core RISC engine that utilizes an instruction memory **200** and a data memory **202**. The second processor **104** of this embodiment is a cached microprocessor macrocell (e.g., an ARM940T macrocell by Advanced RISC Machines) providing a high-performance integer core RISC engine. The second processor **104** has a separate instruction cache **204** and data cache **206**, as well as a memory configuration and protection unit. The instruction and data caches **204** and **206** of the second processor **104** support concurrent processing. In addition, the second processor **104** is capable of performing random read/write ASB accesses and cache line fills, as well as buffered burst writes. The first processor **102** and second processor **104** communicate with the ASB **210** via an AMBA Interface **208a** and **208b**, respectively.

[0038] The first processor **102** and second processor **104** each have two interrupt inputs FIQ# and IRQ# that are active-low level-sensitive. In the disclosed embodiment of the invention, the FIQ# interrupt is of higher priority than the IRQ# interrupt and is serviced first when both interrupts are asserted in unison. Servicing an FIQ# interrupt disables an IRQ# interrupt until the FIQ# interrupt handler exits or re-enables the IRQ# interrupt.

[0039] In addition to RAM **106**, a read only memory (ROM) **216** may be provided on the ASB **210**. Further, an ASB arbiter **218** is coupled to the ASB **210**. The ASB arbiter **218** determines which ASB master has access to the ASB **210**. In this embodiment, there are four ASB masters capable of requesting the ASB **210**: the first processor **102**, the second processor **104**, the host interface **122**, and the DMA controller **212**. The arbitration scheme utilized by the ASB arbiter **218** is based on priority. The DMA controller **212** has the highest priority in order to minimize system latency and data buffering for certain peripherals. The host interface **122** has second priority since its access may be less frequent. The first processor **102** has next priority since its accesses may be generally more time critical than those of the second processor **104**. Of course, other arbitration schemes may be utilized.

[0040] The host interface **122** may also function as a test interface controller (TIC) that provides a parallel test access port to the first and second processor **102** and **104**, as well as the ASB **210**. The TIC allows externally applied test vectors to be converted into internal bus transfers. More than one host interface **122** may be maintained by the cable modem device **100**. For example, in addition to the host interface **122**, a PCI or similar interface may added for communicating to a host system, while the host interface **122** communicates with other peripherals such as voice attachments. The host interface **122** supports a slave mode which provides an external host processor access to its internal memory, as well as memory-mapped register set. The host interface **112** also supports a master mode which allows control signals to access external slave devices such as flash memory or data peripherals.

[0041] An ASB decoder **220** is also coupled to the ASB **210**. The ASB decoder **220** decodes addresses on the ASB

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210, and provides selection signals to each ASB slave. The expansion memory interface **124** includes an expansion memory access controller (XMAC) that provides an interface to support external memory. In the disclosed embodiment of the invention, the expansion memory interface **124** is a 16-bit synchronous interface, although many variations are possible.

[0042] As previously mentioned, a number of physical interfaces to external data sources are coupled to the APB **214**. In particular, a cable media access controller (CMAC) **224**, including a system timer and interfaces to the cable downstream PHY circuitry **114** and cable upstream PHY circuitry **118**, is provided to support communications with a cable media **134**. The CMAC **224** hardware and firmware combine to support a desired specification (e.g., a DOCSIS feature set for the MAC sub-layer of an MCNS cable modem). In general, CMAC **224** aligns incoming packets and prepends a time stamp and appends a pattern recognition trailer structure to form word packets to be delivered to memory by the DMA controller **212**. The CMAC **224** is also responsible for requesting data from the DMA controller **212** at the appropriate time, calculating checksums, and encrypting all or part of the upstream data and bursting the data to the upstream cable upstream PHY circuitry **118**. Exemplary details of the later operation are provided in the previously-incorporated patent application entitled "Method and Apparatus for Upstream Burst Transmission Synchronization in Cable Modems." Delta sigma converter circuitry **228** is also coupled to the CMAC **224** to provide automatic gain control and other functionality for the cable PHY layer.

[0043] A pair of DES/CRC engines **222a** and **222b** are provided as peripherals to the APB **214**. The DES/CRC engines **222a** and **222b** are capable of performing DES encryption or decryption, and/or cyclic-redundancy-checks on a stream of data supplied by the DMA controller **212**. Providing more than one DES/CRC engine **222** permits a plurality of data flow threads to be processed simultaneously.

[0044] An Ethernet external datalink is also coupled to the APB **214**, and is comprised of an Ethernet media access controller (EMAC) **226** and the MII **126**. In the disclosed embodiment of the invention, the EMAC **226** supports the MAC sublayer of the IEEE 802.3 specification and allows it to be connected to an IEEE 802.3 10/100 Mbps (100Base-T and 10Base-T) MII compatible EPHY device or seven-wire HomeLan PHY device. The MII **126** provides a port to transmit and receive data that is media independent, multi-vendor interoperable, and supports all data rates and physical standards. The port consists of datapaths that are generally four bits wide in each direction, as well as control and management signals. The MII **126** can be configured as a glueless connection to support Ethernet or HomeLan serial mode.

[0045] A USB interface **132** is also coupled to the APB **214**. The USB interface **132** can couple to any of a number of compliant external devices. In the disclosed embodiment of the invention, the USB interface **132** supports receive and transmit signaling of 12-Mb/s.

[0046] A number of other miscellaneous peripherals may also be coupled to the APB **214**. For example, a UART **132** may be provided to receive and transmit data, for example, over a telephone line. In addition, a CRC engine **230** is

provided to perform single-cycle computations on input data up to 32 bits at a time. This CRC engine **230** is intended to provide high-performance Header Check Sequence (HCS) calculations, as used in both downstream and upstream CMAC operations.

[0047] Programmable timer circuitry **232** is also coupled to the APB **214**, and may perform a number of functions. For example, the programmable timer circuitry **232** may generate real-time interrupts, as well as perform system "watch-dog" operations. The programmable timer circuitry **232** may also be used as an external event counter.

[0048] A pair of interrupt controllers **234** may be provided, one for each of the first processor **102** and second processor **104**. All peripheral interrupt sources are routed through the interrupt controllers **234**, and reduced to two active low inputs to the first and second processors **102** and **104**—FIQ# and IRQ#—which are asserted in response to specified data operations. Software control interrupts may also be provided.

[0049] A general purpose I/O bus **128** and I²C serial bus **236** are also coupled to the APB **214**. It is contemplated that two of the I/O pins of the general purpose I/O bus **128** may be enabled for software controlled I²C operations via a control register. Pins of the general purpose I/O bus **128** can also serve as external interrupt inputs.

[0050] FIG. 3 is a schematic block diagram providing exemplary details of the first processor **102** of FIG. 1. Again, the first processor **102** is capable of being programmed to implement MAC functionality in accordance with the present invention.

[0051] As discussed generally above, the first processor **102** comprises a processor core **300**, an instruction memory **200**, and a data memory **202**. Each of these elements communicates with the ASB **210** via the AMBA interface **208a**. In one contemplated embodiment of the invention, the processor core **300** is a high-performance integer core such as that used in the ARM940T processor macrocell. In one embodiment of the invention, the instruction memory **200** comprises a 20K×32 SRAM coupled to the instruction address and data busses IA and ID. The data memory **202** of the this embodiment comprises a 12K×32 SRAM coupled to the data and address buses DD and DA.

[0052] Inputs to the processor core **300** include a JTAG test bus, a clock signal CLK, and the interrupts FIQ# and IRQ#. The processor core **300** also interfaces with an instruction memory control bus and data memory control bus coupled to the AMBA interface **208a**. In accordance with the ASB specification, a number of control, address and data signals are communicated between the AMBA interface **208** and the ASB **210**.

[0053] FIG. 4 is a state diagram providing details of an exemplary programmable MAC **400** software architecture implemented by the cable modem device **100** of FIG. 1. The programmable MAC **400** software of this embodiment of the invention is composed of several software processes that perform various tasks and functions. A number of the programmable MAC **400** processes communicate with each other via shared memory regions, functions, or subroutines. Other programmable MAC **400** processes communicate with the operating system via a programmable MAC interface. The programmable MAC interface may be imple-

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mented as a reserved region of data memory or message queues, an interrupt controller, and predefined messages to pass data, configuration parameters, and status information across the interfaces. The programmable MAC **400** processes may span one or more processor contexts. Transitions between programmable MAC **400** processes may occur via external hardware interrupts (IRQ or FIQ), or via a software interrupt causing a change of context. In general, a process executing within a given context will execute linearly until completion or until another context switch occurs.

[0054] The exemplary programmable MAC **400** software of FIG. 4 comprises six (6) major process: a message router process **401**, a command processor **402**, a downstream process **404**, a PLL process **406**, an upstream process **408**, and a map and upstream (MUP) process **410**. These processes are provided by way of example, and it is contemplated that a greater number or a fewer number of processes could be implemented without departing from the spirit or scope of the invention.

[0055] The message router **401** is primarily responsible for managing the flow of information into and out of the programmable MAC. This includes placing programmable MAC downstream data (protocol data units (PDU) and MAC management messages (MMM)) and status messages in the programmable MAC output message FIFO **414**. The message router **401** is also responsible for retrieving programmable MAC upstream data and configuration messages from the programmable MAC input message FIFO **412**. Messages retrieved by the message router **401** are then routed to the appropriate programmable MAC **400** process. The message router **401** is further responsible for managing programmable MAC status interrupts.

[0056] The message router **401** also interacts with a command processor that receives and processes MCNS and other commands. Commands directed to the command processor **402** are placed in the command input message queue **416**, while a command output message queue **418** is used to store output messages from the command processor **402**.

[0057] The downstream process **404** manages and monitors the flow of downstream data. More particularly, the downstream process **404** of the disclosed embodiment of the invention is responsible for: MPEG synchronization, MPEG frame header verification, MCNS frame header verification, extraction of MCNS extended header information, SID perfect filtering, MAC address perfect filtering, imperfect multi-cast address filtering, information element filter, DES decryption, CRC validation, downstream data transfer to the appropriate destination (PLL, MAP processor, or programmable MAC external interface), and downstream statistics.

[0058] Messages from the message router **401** to the downstream process **404** are placed in a downstream process input message queue **424**, while messages from the downstream process **404** to the message router **401** are placed in a downstream process output message queue **426**. The downstream process **404** communicates with a downstream PHY **440** via a downstream interface **446** and MPEG buffers **448**. The downstream process **404** further utilizes a downstream DES/CRC engine **442** to provide decryption and validation functionality.

[0059] The PLL process **406** functions to provide a local clock reference that is phase-locked to a CMTS clock. The

PLL process **406** further provides conversion functions to convert between system time and the local hardware time. In addition, the PLL process **406** communicates status information to the second processor **104** and the other programmable MAC processes. Messages from the message router **401** to the PLL process **406** are placed in a PLL input message queue **428**. Messages from the PLL process **406** to the message router **401** may be placed in a PLL output message queue **430**.

[0060] The upstream process **408** manages the transmission of upstream data. More particularly, the upstream process **408** handles: concatenation/fragmentation of upstream frames, checksum or CRC computation, DES encryption, programming the upstream physical layer or PHY **436**, and ensuring time-to-send requirements are met. The upstream process **408** utilizes an upstream DES/CRC function **432** to coordinate encryption and validation of upstream data. The upstream process **408** further communicates with an upstream interface **438**, and receives linked list data **434** from the MUP process **410**.

[0061] The MUP process **410** handles the processing of downstream MAP frames, manages the scheduling of upstream frame transmission, and handles the ranging process used to optimize communications with a cable headend. The MUP process **410** of the disclosed embodiment of the invention has two entry points: a MUP input message queue **422** that is called by the message router **401** when a new input message is available in the queue, and a MAP queue **440** that is called by the downstream process **404** when new MAP is available. MUP output message queue **420** is also provided for passing data to the message router **401**.

[0062] It is contemplated that additional functions may be added to the exemplary programmable MAC **400** software architecture of FIG. 4, and that other functions may be implemented in hardware.

[0063] FIGS. 5A and 5B are flow diagrams of an exemplary boot process for a programmable MAC according to the present invention. The boot process of the disclosed embodiment of the invention maintains a boot status memory area at a fixed address in memory to allow the second processor **104** to monitor the boot status of the programmable MAC. The boot status memory region preferably resides at a fixed, word-line address in the processor data memory. The programmable MAC updates words in the boot status region with non-zero values as it proceeds through the boot process. The boot process may be conducted by the second processor **104**, by a host system via a host system interface **122**, or by other circuitry of the cable modem device **100**.

[0064] Following commencement of the boot process at step **500**, the programmable MAC stack pointers and variables are initialized at step **502**. The programmable MAC can maintain separate stacks for each of the separate contexts or operating modes of the processor **102**. These stacks, as well as processor data memory variables, are initialized in this step.

[0065] Next, in step **504**, the boot process calls a boot function to perform the remainder of the disclosed programmable MAC boot process. The boot function of the boot process proceeds to step **506**, where a checksum is performed on the programmable MAC software loaded into the

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processor instruction memory. The computed checksum is then compared to a value stored in a global memory variable. Next, beginning with step 508, all programmable MAC software processes are initialized via initialization routines called by the boot process. The downstream process is first initialized in step 508, followed by initialization of PLL in step 510. The MAP process is next initialized in step 512.

[0066] The boot process continues at step 514 (FIG. 5B) where the upstream process is initialized. The programmable MAC interface is next initialized in step 516, followed by initialization of the command process in step 518.

[0067] Following initialization of the programmable MAC software processes, the boot process determines if the initialization routines executed correctly. If not, the boot process writes a "fail" value to the operating state word of the boot status memory. Next, a boot failure loop is entered in step 524, although it is contemplated that step 522 may be performed upon entry into the boot failure loop. In addition, if the boot process fails, a power-on reset may be applied by the second processor 104.

[0068] If the initialization routines executed correctly as determined in step 520, the boot process proceeds to step 526 and a version number of the programmable MAC software is written to the operating state word of the boot state status memory. Next, in step 528, the boot process enable interrupt bits associated with the programmable MAC interface or message router 401. Finally, the boot process sends a message to the operating system indicating that the power on processes is complete and the programmable MAC is ready for operation.

[0069] Thus, a cable modem having a programmable MAC has been described. The programmable MAC features of the cable modem provide a software upgrade path to permit support for new versions and variations of cable modem standards, thereby reducing or eliminating hardware development costs.

[0070] In view of the above detailed description of the present invention and associated drawings, other modifications and variations will now become apparent to those skilled in the art. It should also be apparent that such other modifications and variations may be effected without departing from the spirit and scope of the present invention.

What is claimed is:

1. A cable modem having a programmable media access controller, comprising:

- a system bus;
- a plurality of processors, each of the plurality of processors is communicatively coupled to the system bus, that perform a plurality of processing functions, the plurality of processing functions are partitioned, at least in part, between at least two of the plurality of processors;
- a peripheral bus that is operable to perform transfer of cable media;
- a bridge that communicatively couples the system bus and the peripheral bus; and
- a peripheral processing device, communicatively coupled to the peripheral bus, that is operable to perform processing of a selectively off-loaded portion of the cable media.

2. The cable modem of claim 1, wherein one of the plurality of processors supports upstream data transfer of cable media received by the cable modem; and

at least one other of the plurality of processors supports downstream data transfer of the cable media transmitted by the cable modem.

3. The cable modem of claim 1, wherein one of the plurality of processors is operable to perform at least one of message processing and scheduling.

4. The cable modem of claim 1, wherein the bridge comprises a direct memory access controller that is operable selectively to provide a portion of the cable media to one of the plurality of processors and to provide the off-loaded portion of the cable media to the peripheral processing device.

5. The cable modem of claim 1, further comprising at least one additional peripheral processing device, communicatively coupled to the peripheral bus, that is operable to perform processing of at least one additional selectively off-loaded portion of the cable media.

6. The cable modem of claim 1, wherein the plurality of processing functions comprises operating system functionality.

7. The cable modem of claim 1, wherein the plurality of processing functions comprises media access control functionality.

8. The cable modem of claim 1, wherein one of the plurality of processors employs embedded code to support media access control functionality.

9. A cable modem device, comprising:

a bifurcated bus structure comprising a first bus and a second bus;

a partitioned processor structure, communicatively coupled to the first bus, comprising a plurality of processors, that is operable to perform a plurality of processing functions;

a co-processor, communicatively coupled to the second bus, that is operable to support processing of cable media that is selectively off-loaded from at least one of the plurality of processors;

an input/output interface, communicatively coupled to the second bus, that is operable to perform data transfer of a plurality of data to the second bus; and

a direct memory access controller that communicatively couples the first bus and the second bus and that is operable to support off-loading of at least one function of the plurality of functions to the co-processor.

10. The cable modem device of claim 9, further comprising at least one additional coprocessor, communicatively coupled to the second bus, that is also operable to support processing of cable media that is selectively off-loaded from at least one of the plurality of processors.

11. The cable modem device of claim 9, wherein the first bus employs an Advanced System Bus protocol; and

the second bus employs an Advanced Peripheral Bus protocol.

12. The cable modem device of claim 9, wherein one of the plurality of processors supports upstream data transfer of cable media received by the cable modem; and

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- at least one other of the plurality of processors supports downstream data transfer of the cable media transmitted by the cable modem.
- 13.** The cable modem device of claim 9, wherein the co-processor is operable to perform at least one of DES encryption and DES decryption.
- 14.** The cable modem device of claim 9, wherein the plurality of processing functions comprises operating system functionality and media access control functionality.
- 15.** The cable modem device of claim 9, wherein the second bus operates consuming power at a rate lower than a rate at which the first bus consumes power.
- 16.** The cable modem device of claim 9 manufactured as an integrated circuit.
- 17.** A method to perform processing within a cable modem, the method comprising:
- performing cable media processing using a plurality of processors, the cable media processing is partitioned, at least in part, between at least two of the plurality of processors;
- selectively off-loading a portion of the cable media from at least one of the plurality of processors to a co-processor; and
- processing the off-loaded portion of the cable media using the co-processor.
- 18.** The method of claim 17, wherein the method is performed within an integrated circuit.
- 19.** The method of claim 17, wherein at least one of the plurality of processors comprises embedded code that is substantially operable for media access control functionality.
- 20.** The method of claim 17, further comprising directing upstream and downstream communications of cable media using at least two of the plurality of processors.
- * * * * *

EXHIBIT D



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| MCANDREWS HELD & MALLOY, LTD | | | EXAMINER | |
| 500 WEST MADISON STREET | | | HUYNH, DUNG B. | |
| SUITE 3400 | | | | |
| CHICAGO, ILLINOIS 60661 | | | | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mhmpto@mcandrews-ip.com

Office Action Summary**Application No.**

15/866,106

Applicant(s)

Ling et al.

Examiner

DUNG B HUYNH

Art Unit

2469

AIA Status

No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01/09/2018.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

- 5) ☒ Claim(s) 1-18 is/are pending in the application.
 5a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) ____ is/are allowed.
- 7) ☒ Claim(s) 1-18 is/are rejected.
- 8) ☐ Claim(s) ____ is/are objected to.
- 9) ☐ Claim(s) ____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☒ The drawing(s) filed on 01/09/2018 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

- a) ☐ All b) ☐ Some** c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)
 Paper No(s)/Mail Date ____.
- 3) ☐ Interview Summary (PTO-413)
 Paper No(s)/Mail Date ____.
- 4) ☐ Other: ____.

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DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Drawings

2. The drawings were received on 02/16/2017 are accepted for examination purpose.

Double Patenting

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory

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double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(I)(1) - 706.02(I)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

Note that the applicant filling of the continuing application is voluntary and not direct, unmodified result of restriction requirement under 35 U.S.C. 121 (i.e. without a restriction requirement by the examiner) and the claims of the second application (continuing application) are drawn to the “same” invention” as the first application or patent.

4. Claims 1-18 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-18 of U.S. Patent No. 9,577,886 B2 to Ling et al.

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Although the claims at issue are not identical, they are not patentably distinct from each other for the reasons set forth below.

Regarding **claim 1**, although the claims at issue are not identical, they are not patentably distinct from each other because claim 1 of the instant application merely broadens the scope of the claim 1 of the Ling Patent by eliminating the elements and their respective functions of the claims as set forth below.

| Claim 1 of Instant application | Claim 1 of US Patent No. 9,577,886 B2 |
|---|--|
| Limitation 1 : A method comprising: determining, by a cable modem termination system (CMTS), for each cable modem served by said CMTS, a corresponding signal-to-noise ratio (SNR) related metric; | Limitation 1 : A method comprising: determining, by a cable modem termination system (CMTS), for a <u>plurality of cable modems</u> served by said CMTS, a corresponding plurality of signal-to-noise ratio (SNR) related metrics <u>comprising SNR versus frequency profiles</u> ; |
| Limitation 2 : assigning, by said CMTS, each cable modem among a plurality of service groups based on a respective corresponding SNR-related metric; | Limitation 2 : assigning, by said CMTS, said <u>plurality of cable modems</u> among a plurality of service groups based on said plurality of SNR-related metrics; |
| Limitation 3 : generating, by said CMTS for each one of said plurality of service groups, a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics corresponding to said one of said plurality of service groups; | Limitation 3 : generating, by said CMTS for each one of said plurality of service groups, a composite SNR-related metric based on a portion of said plurality of SNR-related metrics corresponding to said one of said plurality of service groups; |
| Limitation 4 : selecting, by said CMTS, one or more physical layer communication parameter to be used for communicating with said one of said plurality of service groups based on said composite SNR-related metric; and | Limitation 4 : selecting, by said CMTS, physical layer communication parameters to be used for communicating with said one of said plurality of service groups based on said composite SNR-related metric; and |
| Limitation 5 : communicating, by said CMTS, with one or more cable modems corresponding to said one of said plurality of service groups using said selected one or more physical layer communication parameter. | Limitation 5 : communicating, by said CMTS, with a portion of said plurality of cable modems corresponding to said one of said plurality of service groups using said selected physical layer <u>communication parameters</u> . |

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|--------------------------------|---|
| Claim 1 of Instant application | Claim 1 of US Patent No. 9,577,886 B2 |
| Limitation 6 : NONE | Limitation 6 : <u>wherein said composite SNR related metric is a worst-case SNR versus frequency profile for said one of said plurality of service groups.</u> |

In view of the above, it is clear that the conflicting claims are not patentably distinct from each other because claim 1 of the instant application merely broadens the scope of the claim 1 of the Ling Patent by eliminating the italicized and underlined portion of limitations 1, 2 and 5 of Ling Patent's claim 1 and entire limitation 6 of Ling Patent's claim 1.

| Instant application | US Patent No. 9,577,886 B2 |
|---|---|
| Claim 2: The method of claim 1, wherein said one or more physical layer communication parameter includes one or more of: transmit power, receive sensitivity, timeslot duration, modulation type, modulation order, forward error correction (FEC) type, and FEC code rate. | Claim 2: The method of claim 1, wherein said physical layer communication parameters include one or more of: transmit power, receive sensitivity, timeslot duration, modulation type, modulation order, forward error correction (FEC) type, and FEC code rate. |
| Claim 3: The method of claim 1, wherein said CMTS uses orthogonal frequency division multiplexing (OFDM) over a plurality of subcarriers for said communicating. | Claim 3: The method of claim 1, wherein said CMTS uses orthogonal frequency division multiplexing (OFDM) over a plurality of subcarriers for said communicating. |
| Claim 4: The method of claim 3, comprising selecting, by said CMTS, said one or more physical layer communication parameter on a per-OFDM-subcarrier basis. | Claim 4: The method of claim 3, comprising selecting, by said CMTS, said physical layer communication parameters on a per-OFDM-subcarrier basis. |
| Claim 5: The method of claim 4, wherein said one or more physical layer communication parameter includes one or both of: which of said OFDM subcarriers to use for transmission to said CMTS, and which of said OFDM subcarriers to use for reception of information from said CMTS. | Claim 5: The method of claim 4, wherein said physical layer communication parameters include one or both of: which of said OFDM subcarriers to use for transmission to said CMTS, and which of said OFDM subcarriers to use for reception of information from said CMTS. |

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|---|---|
| <p>Claim 6: The method of claim 1, wherein: said plurality of service groups comprises a first service group and a second service group; said first service group has a first composite SNR versus frequency profile, said second service group has a second composite SNR versus frequency profile, and a particular cable modem has a particular SNR versus frequency profile; and said assigning said each cable modem among said plurality of service groups comprises, for the particular cable modem: assigning said particular cable modem to said first service group if said particular SNR versus frequency profile is more similar to said first composite SNR versus frequency profile than to said second composite SNR versus frequency profile; and assigning said particular cable modem to said second service group if said particular SNR versus frequency profile is more similar to said second composite SNR versus frequency profile than to said first composite SNR versus frequency profile.</p> | <p>Claim 6: The method of claim 1, wherein: said plurality of service groups comprises a first service group and a second service group; said first service group has a first composite SNR versus frequency profile, said second service group has a second composite SNR versus frequency profile, and a third cable modem has a particular SNR versus frequency profile; and said assigning said plurality of cable modems among said plurality of service groups comprises: assigning said third cable modem to said first service group if said particular SNR versus frequency profile is more similar to said first composite SNR versus frequency profile than to said second composite SNR versus frequency profile; and assigning said third cable modem to said second service group if said particular SNR versus frequency profile is more similar to said second composite SNR versus frequency profile than to said first composite SNR versus frequency profile.</p> |
| <p>Claim 7: The method of claim 1, comprising assigning said cable modems among said plurality of service groups based on respective distances between said CMTS and said cable modems.</p> | <p>Claim 7: The method of claim 1, comprising assigning said plurality of cable modems among said plurality of service groups based on distances between said CMTS and said plurality of cable modems.</p> |
| <p>Claim 8: The method of claim 1, comprising assigning any particular one of said cable modems to one of said plurality of service groups based on which one or more of a plurality of branch amplifiers are upstream of said one of said plurality of cable modems.</p> | <p>Claim 8: The method of claim 1, comprising assigning any particular one of said plurality of cable modems to one of said plurality of service groups based on which one or more of a plurality of branch amplifiers are upstream of said one of said plurality of cable modems.</p> |
| <p>Claim 9: The method of claim 1, wherein said determining said plurality of SNR-related metrics comprises: transmitting a probe message to each</p> | <p>Claim 9: The method of claim 1, wherein said determining said plurality of SNR-related metrics comprises: transmitting a probe message to each</p> |

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| cable modem, said probe message comprising instructions for measuring a metric and reporting said measured metric back to said CMTS; and receiving a metric reporting message from each cable modem. | said plurality of cable modems, said probe message comprising instructions for measuring a metric and reporting said measured metric back to said CMTS; and receiving a metric reporting message from each of said plurality of cable modems. |

In view of the above, the conflicting claims are not patentably distinct from each other because claims 2-9 of the instant application are merely similar to the scope of the claims 2-9 of the Ling Patent.

| Claim 10 of Instant application | Claim 10 of US Patent No. 9,577,886 B2 |
|--|---|
| Limitation 1 : A system comprising: circuitry for use in a cable modem termination system (CMTS), said circuitry comprising a network interface and a processor wherein: | Limitation 1 : A system comprising: circuitry for use in a cable modem termination system (CMTS), said circuitry comprising a network interface and a processor wherein: |
| Limitation 2 : said processor is configured to determine, for each cable modem served by said CMTS, a corresponding signal-to-noise ratio (SNR) related metric; | Limitation 2 : said processor is configured to determine, for a plurality of cable modems served by said CMTS, a corresponding plurality of signal-to-noise ratio (SNR) related metrics <i>comprising SNR versus frequency profiles</i> ; |
| Limitation 3 : said processor is configured to assign each of said cable modems among a plurality of service groups based on a respective corresponding SNR-related metric; | Limitation 3 : said processor is configured to assign said <i>plurality of cable modems</i> among a plurality of service groups based on said plurality of SNR-related metrics; |
| Limitation 4 : said processor is configured to generate, for each one of said plurality of service groups, a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics corresponding to said one of said plurality of service groups; | Limitation 4 : said processor is configured to generate, for each one of said plurality of service groups, a composite SNR-related metric based on a portion of said plurality of SNR-related metrics corresponding to said one of said plurality of service groups; |
| Limitation 5 : said processor is configured to select one or more physical layer communication parameter to be used for | Limitation 5 : said processor is configured to select physical layer communication parameters to be used for communicating with said one of said |

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| Claim 10 of Instant application | Claim 10 of US Patent No. 9,577,886 B2 |
|--|---|
| communicating with said one of said plurality of service groups based on said composite SNR-related metric; and | plurality of service groups based on said composite SNR-related metric; and |
| Limitation 6 : said network interface is configured to communicate with one or more cable modems corresponding to said one of said plurality of service groups using the one or more selected physical layer communication parameter. | Limitation 6 : said network interface is configured to communicate with a portion of said plurality of cable modems corresponding to said one of said plurality of service groups using <u>the selected physical layer communication parameters.</u> |
| Limitation 7 : NONE | Limitation 7 : <u>wherein said composite SNR related metric is a worst-case SNR versus frequency profile for said one of said plurality of service groups.</u> |

In view of the above, it is clear that the conflicting claims are not patentably distinct from each other because claim 10 of the instant application merely broadens the scope of the claim 10 of the Ling Patent by eliminating the italicized and underlined portion of limitations 2, 3 and 6 of Ling Patent's claim 10 and entire limitation 7 of Ling Patent's claim 10.

| Instant application | US Patent No. 9,577,886 B2 |
|--|--|
| Claim 11: The system of claim 10, wherein said one or more physical layer communication parameter includes one or more of: transmit power, receive sensitivity, timeslot duration, modulation type, modulation order, forward error correction (FEC) type, and FEC code rate. | Claim 11: The system of claim 10, wherein said physical layer communication parameters include one or more of: transmit power, receive sensitivity, timeslot duration, modulation type, modulation order, forward error correction (FEC) type, and FEC code rate. |
| Claim 12: The system of claim 10, wherein said network interface and said cable modems are configured to communicate using orthogonal frequency division multiplexing (OFDM) over a plurality of subcarriers. | Claim 12: The system of claim 10, wherein said network interface and said plurality of cable modems are configured to communicate using orthogonal frequency division multiplexing (OFDM) over a plurality of subcarriers. |
| Claim 13: The system of claim 12, wherein said network interface is | Claim 13: The system of claim 12, wherein said network interface is |

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|--|--|
| configured such that at least one of said one or more physical layer communication parameters are configurable on a per-OFDM-subcarrier basis. | configured such that said physical layer communication parameters are configurable on a per-OFDM-subcarrier basis. |
| Claim 14: The system of claim 12, wherein said one or more physical layer communication parameter includes one or both of: which of said OFDM subcarriers to use for transmission to said CMTS, and which of said OFDM subcarriers to use for reception of information from said CMTS. | Claim 14: The system of claim 12, wherein said physical layer communication parameters include one or both of: which of said OFDM subcarriers to use for transmission to said CMTS, and which of said OFDM subcarriers to use for reception of information from said CMTS. |
| Claim 15: The system of claim 10, wherein: said plurality of service groups comprises a first service group and a second service group; said first service group has a first composite SNR versus frequency profile, said second service group has a second composite SNR versus frequency profile, and a particular cable modem has a particular SNR versus frequency profile; said assignment of said each cable modem among said plurality of service groups comprises, for the particular cable modem: assignment of said particular cable modem to said first service group if said particular SNR versus frequency profile is more similar to said first composite SNR versus frequency profile than to said second composite SNR versus frequency profile; and assignment of said particular cable modem to said second service group if said particular SNR versus frequency profile is more similar to said second composite SNR versus frequency profile than to said first composite SNR versus frequency profile. | Claim 15: The system of claim 10, wherein: said plurality of service groups comprises a first service group and a second service group; said first service group has a first composite SNR versus frequency profile, said second service group has a second composite SNR versus frequency profile, and a third cable modem has a particular SNR versus frequency profile; said assignment of said plurality of cable modems among said plurality of service groups comprises: assignment of said third cable modem to said first service group if said particular SNR versus frequency profile is more similar to said first composite SNR versus frequency profile than to said second composite SNR versus frequency profile; and assignment of said third cable modem to said second service group if said particular SNR versus frequency profile is more similar to said second composite SNR versus frequency profile than to said first composite SNR versus frequency profile. |
| Claim 16: The system of claim 10, wherein said processor is configured to assign said cable modems among said plurality of service groups based on | Claim 16: The system of claim 10, wherein said processor is configured to assign said plurality of cable modems among said plurality of service groups |

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|--|---|
| respective distances between said CMTS and said cable modems. | based on distances between said CMTS and said plurality of cable modems. |
| Claim 17: The system of claim 10, wherein said processor is configured to assign each of said cable modems among said plurality of service groups based on one or more branch amplifier that serves said each of said cable modems. | Claim 17: The system of claim 10, wherein said processor is configured to assign said plurality of cable modems among said plurality of service groups based on a branch further branch amplifier that serves each of said plurality of cable modems. |
| Claim 18: The system of claim 10, wherein said determination of said plurality of SNR-related metrics comprises: transmission, via said network interface, of a probe message to each cable modem, said probe message comprising instructions for measuring a metric and reporting said measured metric back to said CMTS; and reception, via said network interface of said CMTS, of a metric reporting message from each cable modem. | Claim 18: The system of claim 10, wherein said determination of said plurality of SNR-related metrics comprises: transmission, via said network interface, of a probe message to each said plurality of cable modems, said probe message comprising instructions for measuring a metric and reporting said measured metric back to said CMTS; and reception, via said network interface of said CMTS, of a metric reporting message from each of said plurality of cable modems. |

In view of the above, the conflicting claims are not patentably distinct from each other because claims 11-18 of the instant application are merely similar to the scope of the claims 11-18 of the Ling Patent.

5. **Claims 1-18 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-18 of U.S. Patent No. 9,419,858 B2 to Ling et al. (hereafter refers as Ling Patent'858).** Although the claims at issue are not identical, they are not patentably distinct from each other for the reasons set forth below.

Regarding **claim 1**, although the claims at issue are not identical, they are not patentably distinct from each other because claim 1 of the instant application merely

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broadens the scope of the claim 1 of the Ling Patent'858 by eliminating the elements and their respective functions of the claims as set forth below.

| Claim 1 of Instant application | Claim 1 of Ling Patent'858 |
|---|--|
| Limitation 1 : A method comprising: determining, by a cable modem termination system (CMTS), for each cable modem served by said CMTS, a corresponding signal-to-noise ratio (SNR) related metric; | Limitation 1 : A method comprising: determining, by a cable modem termination system (CMTS), for a plurality of cable modems served by said CMTS, a corresponding plurality of signal-to-noise ratio (SNR) related metrics; |
| Limitation 2 : assigning, by said CMTS, each cable modem among a plurality of service groups based on a respective corresponding SNR-related metric; | Limitation 2 : assigning, by said CMTS, said <u>plurality of cable modems</u> among a plurality of service groups based on said plurality of SNR-related metrics; |
| Limitation 3 : generating, by said CMTS for each one of said plurality of service groups, a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics corresponding to said one of said plurality of service groups; | Limitation 3 : generating, by said CMTS for each one of said plurality of service groups, a composite SNR-related metric based on a portion of said plurality of SNR-related metrics corresponding to said one of said plurality of service groups; |
| Limitation 4 : selecting, by said CMTS, one or more physical layer communication parameter to be used for communicating with said one of said plurality of service groups based on said composite SNR-related metric; and | Limitation 4 : selecting, by said CMTS, physical layer communication parameters to be used for communicating with said one of said plurality of service groups based on said composite SNR-related metric; and |
| Limitation 5 : communicating, by said CMTS, with one or more cable modems corresponding to said one of said plurality of service groups using said selected one or more physical layer communication parameter. | Limitation 5 : communicating, by said CMTS, with a portion of said plurality of cable modems corresponding to said one of said plurality of service groups using said <u>selected physical layer communication parameters</u> |
| Limitation 6 : NONE | Limitation 6 : <u>wherein: each of said SNR-related metrics is signal-to-noise ratio (SNR) versus frequency profile; and said composite SNR related metric is a worst-case SNR versus frequency profile for said one of said plurality of service groups.</u> |

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In view of the above, it is clear that the conflicting claims are not patentably distinct from each other because claim 1 of the instant application merely broadens the scope of the claim 1 of the Ling Patent'858 by eliminating the italicized and underlined portion of limitations 2 and 5 of the Ling Patent'858's claim 1 and the entire limitation 6 of Ling Patent'858's claim 1.

| Instant application | Ling Patent'858 |
|--|--|
| Claim 2: The method of claim 1, wherein said one or more physical layer communication parameter includes one or more of: transmit power, receive sensitivity, timeslot duration, modulation type, modulation order, forward error correction (FEC) type, and FEC code rate. | Claim 2: The method of claim 1, wherein said physical layer communication parameters include one or more of: transmit power, receive sensitivity, timeslot duration, modulation type, modulation order, forward error correction (FEC) type, and FEC code rate. |
| Claim 3: The method of claim 1, wherein said CMTS uses orthogonal frequency division multiplexing (OFDM) over a plurality of subcarriers for said communicating. | Claim 3: The method of claim 1, wherein said CMTS uses orthogonal frequency division multiplexing (OFDM) over a plurality of subcarriers for said communicating. |
| Claim 4: The method of claim 3, comprising selecting, by said CMTS, said one or more physical layer communication parameter on a per-OFDM-subcarrier basis. | Claim 4: The method of claim 3, comprising selecting, by said CMTS, said physical layer communication parameters on a per-OFDM-subcarrier basis. |
| Claim 5: The method of claim 4, wherein said one or more physical layer communication parameter includes one or both of: which of said OFDM subcarriers to use for transmission to said CMTS, and which of said OFDM subcarriers to use for reception of information from said CMTS. | Claim 5: The method of claim 4, wherein said physical layer communication parameters include one or both of: which of said OFDM subcarriers to use for transmission to said CMTS, and which of said OFDM subcarriers to use for reception of information from said CMTS. |
| Claim 6: The method of claim 1, wherein: said plurality of service groups comprises a first service group and a second service group; said first service group has a first composite SNR versus frequency profile, said second service group has a second composite SNR versus frequency profile, and a | Claim 6: The method of claim 1, wherein: said plurality of service groups comprises a first service group and a second service group; said first service group has a first composite SNR versus frequency profile, said second service group has a second composite SNR versus frequency profile, and a |

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|--|--|
| <p>particular cable modem has a particular SNR versus frequency profile; and said assigning said each cable modem among said plurality of service groups comprises, for the particular cable modem: assigning said particular cable modem to said first service group if said particular SNR versus frequency profile is more similar to said first composite SNR versus frequency profile than to said second composite SNR versus frequency profile; and assigning said particular cable modem to said second service group if said particular SNR versus frequency profile is more similar to said second composite SNR versus frequency profile than to said first composite SNR versus frequency profile.</p> | <p>third cable modem has a particular SNR versus frequency profile; and said assigning said plurality of cable modems among said plurality of service groups comprises: assigning said third cable modem to said first service group if said particular SNR versus frequency profile is more similar to said first composite SNR versus frequency profile than to said second composite SNR versus frequency profile; and assigning said third cable modem to said second service group if said particular SNR versus frequency profile is more similar to said second composite SNR versus frequency profile than to said first composite SNR versus frequency profile.</p> |
| <p>Claim 7: The method of claim 1, comprising assigning said cable modems among said plurality of service groups based on respective distances between said CMTS and said cable modems.</p> | <p>Claim 7: The method of claim 1, comprising assigning said plurality of cable modems among said plurality of service groups based on distances between said CMTS and said plurality of cable modems.</p> |
| <p>Claim 8: The method of claim 1, comprising assigning any particular one of said cable modems to one of said plurality of service groups based on which one or more of a plurality of branch amplifiers are upstream of said one of said plurality of cable modems.</p> | <p>Claim 8: The method of claim 1, comprising assigning any particular one of said plurality of cable modems to one of said plurality of service groups based on which one or more of a plurality of branch amplifiers are upstream of said one of said plurality of cable modems.</p> |
| <p>Claim 9: The method of claim 1, wherein said determining said plurality of SNR-related metrics comprises: transmitting a probe message to each cable modem, said probe message comprising instructions for measuring a metric and reporting said measured metric back to said CMTS; and receiving a metric reporting message from each cable modem.</p> | <p>Claim 9: The method of claim 1, wherein said determining said plurality of SNR-related metrics comprises: transmitting a probe message to each said plurality of cable modems, said probe message comprising instructions for measuring a metric and reporting said measured metric back to said CMTS; and receiving a metric reporting message from each of said plurality of cable modems.</p> |

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In view of the above, the conflicting claims are not patentably distinct from each other because claims 2-9 of the instant application are merely similar to the scope of the claims 2-9 of the Ling Patent'858.

| Claim 10 of Instant application | Claim 10 of Ling Patent'858 |
|--|---|
| Limitation 1 : A system comprising: circuitry for use in a cable modem termination system (CMTS), said circuitry comprising a network interface and a processor wherein: | Limitation 1 : A system comprising: circuitry for use in a cable modem termination system (CMTS), said circuitry comprising a network interface and a processor wherein: |
| Limitation 2 : said processor is configured to determine, for each cable modem served by said CMTS, a corresponding signal-to-noise ratio (SNR) related metric; | Limitation 2 : said processor is configured to determine, <u>for a plurality of cable modems</u> served by said CMTS, a corresponding plurality of signal-to-noise ratio (SNR) related metrics; |
| Limitation 3 : said processor is configured to assign each of said cable modems among a plurality of service groups based on a respective corresponding SNR-related metric; | Limitation 3 : said processor is configured to assign <u>said plurality of cable modems</u> among a plurality of service groups based on said plurality of SNR-related metrics; |
| Limitation 4 : said processor is configured to generate, for each one of said plurality of service groups, a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics corresponding to said one of said plurality of service groups; | Limitation 4 : said processor is configured to generate, for each one of said plurality of service groups, a composite SNR-related metric based on a portion of said plurality of SNR-related metrics corresponding to said one of said plurality of service groups; |
| Limitation 5 : said processor is configured to select one or more physical layer communication parameter to be used for communicating with said one of said plurality of service groups based on said composite SNR-related metric; and | Limitation 5 : said processor is configured to select physical layer communication parameters to be used for communicating with said one of said plurality of service groups based on said composite SNR-related metric; and |
| Limitation 6 : said network interface is configured to communicate with one or more cable modems corresponding to said one of said plurality of service groups using the one or more selected physical layer communication parameter. | Limitation 6 : said network interface is configured to communicate with a portion of said plurality of cable modems corresponding to said one of said plurality of service groups using the <u>selected physical layer communication parameters</u> |

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| Claim 10 of Instant application | Claim 10 of Ling Patent'858 |
|---------------------------------|--|
| Limitation 7 : NONE | Limitation 7 : <u>wherein: each of said SNR-related metrics is signal-to-noise ratio (SNR) versus frequency profile; and said composite SNR related metric is a worst-case SNR versus frequency profile for said one of said plurality of service groups.</u> |

In view of the above, it is clear that the conflicting claims are not patentably distinct from each other because claim 10 of the instant application merely broadens the scope of the claim 10 of the Ling Patent'858 eliminating the italicized and underlined portion of limitations 2, 3 and 6 of Ling Patent'858's claim 10 and by eliminating the entire limitation 7 of Ling Patent'858's claim 10.

| Instant application | Ling Patent'858 |
|--|--|
| Claim 11: The system of claim 10, wherein said one or more physical layer communication parameter includes one or more of: transmit power, receive sensitivity, timeslot duration, modulation type, modulation order, forward error correction (FEC) type, and FEC code rate. | Claim 11: The system of claim 10, wherein said physical layer communication parameters include one or more of: transmit power, receive sensitivity, timeslot duration, modulation type, modulation order, forward error correction (FEC) type, and FEC code rate. |
| Claim 12: The system of claim 10, wherein said network interface and said cable modems are configured to communicate using orthogonal frequency division multiplexing (OFDM) over a plurality of subcarriers. | Claim 12: The system of claim 10, wherein said network interface and said plurality of cable modems are configured to communicate using orthogonal frequency division multiplexing (OFDM) over a plurality of subcarriers. |
| Claim 13: The system of claim 12, wherein said network interface is configured such that at least one of said one or more physical layer communication parameters are configurable on a per-OFDM-subcarrier basis. | Claim 13: The system of claim 12, wherein said network interface is configured such that said physical layer communication parameters are configurable on a per-OFDM-subcarrier basis. |
| Claim 14: The system of claim 12, wherein said one or more physical layer communication parameter | Claim 14: The system of claim 12, wherein said physical layer communication parameters include one |

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|--|--|
| includes one or both of: which of said OFDM subcarriers to use for transmission to said CMTS, and which of said OFDM subcarriers to use for reception of information from said CMTS. | or both of: which of said OFDM subcarriers to use for transmission to said CMTS, and which of said OFDM subcarriers to use for reception of information from said CMTS. |
| Claim 15: The system of claim 10, wherein: said plurality of service groups comprises a first service group and a second service group; said first service group has a first composite SNR versus frequency profile, said second service group has a second composite SNR versus frequency profile, and a particular cable modem has a particular SNR versus frequency profile; said assignment of said each cable modem among said plurality of service groups comprises, for the particular cable modem: assignment of said particular cable modem to said first service group if said particular SNR versus frequency profile is more similar to said first composite SNR versus frequency profile than to said second composite SNR versus frequency profile; and assignment of said particular cable modem to said second service group if said particular SNR versus frequency profile is more similar to said second composite SNR versus frequency profile than to said first composite SNR versus frequency profile. | Claim 15: The system of claim 10, wherein: said plurality of service groups comprises a first service group and a second service group; said first service group has a first composite SNR versus frequency profile, said second service group has a second composite SNR versus frequency profile, and a third cable modem has a particular SNR versus frequency profile; said assignment of said plurality of cable modems among said plurality of service groups comprises: assignment of said third cable modem to said first service group if said particular SNR versus frequency profile is more similar to said first composite SNR versus frequency profile than to said second composite SNR versus frequency profile; and assignment of said third cable modem to said second service group if said particular SNR versus frequency profile is more similar to said second composite SNR versus frequency profile than to said first composite SNR versus frequency profile. |
| Claim 16: The system of claim 10, wherein said processor is configured to assign said cable modems among said plurality of service groups based on respective distances between said CMTS and said cable modems. | Claim 16: The system of claim 10, wherein said processor is configured to assign said plurality of cable modems among said plurality of service groups based on distances between said CMTS and said plurality of cable modems. |
| Claim 17: The system of claim 10, wherein said processor is configured to assign each of said cable modems among said plurality of service groups based on one or more branch amplifier | Claim 17: The system of claim 10, wherein said processor is configured to assign said plurality of cable modems among said plurality of service groups based on a branch further branch |

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| Instant application | Ling Patent'858 |
|--|---|
| that serves said each of said cable modems. | amplifier that serves each of said plurality of cable modems. |
| Claim 18: The system of claim 10, wherein said determination of said plurality of SNR-related metrics comprises: transmission, via said network interface, of a probe message to each cable modem, said probe message comprising instructions for measuring a metric and reporting said measured metric back to said CMTS; and reception, via said network interface of said CMTS, of a metric reporting message from each cable modem. | Claim 18: The system of claim 10, wherein said determination of said plurality of SNR-related metrics comprises: transmission, via said network interface, of a probe message to each said plurality of cable modems, said probe message comprising instructions for measuring a metric and reporting said measured metric back to said CMTS; and reception, via said network interface of said CMTS, of a metric reporting message from each of said plurality of cable modems. |

In view of the above, the conflicting claims are not patentably distinct from each other because claims 11-18 of the instant application are merely similar to the scope of the claims 11-18 of the Ling Patent'858.

6. **Claims 1-18 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-18 of U.S. Patent No. 9,866,438 B2 to Ling et al. (hereafter refers as Ling Patent'438).** Although the claims at issue are not identical, they are not patentably distinct from each other for the reasons set forth below.

Regarding **claim 1**, although the claims at issue are not identical, they are not patentably distinct from each other because claim 1 of the instant application merely broadens the scope of the claim 1 of the Ling Patent'438 by eliminating the elements and their respective functions of the claims as set forth below.

| Claim 1 of Instant application | Claim 1 of Ling Patent'438 |
|--|--|
| Limitation 1 : A method comprising: determining, by a cable modem termination system (CMTS), for each | Limitation 1 : A method comprising: determining, by a cable modem termination system (CMTS), for <u>a plurality</u> |

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| Claim 1 of Instant application | Claim 1 of Ling Patent'438 |
|---|--|
| cable modem served by said CMTS, a corresponding signal-to-noise ratio (SNR) related metric; | <u>of cable modems</u> served by said CMTS, a corresponding plurality of signal-to-noise ratio (SNR) related metrics; |
| Limitation 2 : assigning, by said CMTS, each cable modem among a plurality of service groups based on a respective corresponding SNR-related metric; | Limitation 2 : assigning, by said CMTS, said <u>plurality of cable modems</u> among a plurality of service groups based on said plurality of SNR-related metrics; |
| Limitation 3 : generating, by said CMTS for each one of said plurality of service groups, a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics corresponding to said one of said plurality of service groups; | Limitation 3 : generating, by said CMTS for each one of said plurality of service groups, a composite SNR-related metric based at least in part on a worst-case SNR profile of said plurality of SNR-related metrics corresponding to said one of said plurality of service groups; |
| Limitation 4 : selecting, by said CMTS, one or more physical layer communication parameter to be used for communicating with said one of said plurality of service groups based on said composite SNR-related metric; and | Limitation 4 : selecting, by said CMTS, <u>physical layer communication parameters</u> to be used for communicating with said one of said plurality of service groups based on said composite SNR-related metric; and |
| Limitation 5 : communicating, by said CMTS, with one or more cable modems corresponding to said one of said plurality of service groups using said selected one or more physical layer communication parameter. | Limitation 5 : communicating, by said CMTS, with a portion of said plurality of cable modems corresponding to said one of said plurality of service groups using said selected <u>physical layer communication parameters</u> . |

In view of the above, it is clear that the conflicting claims are not patentably distinct from each other because claim 1 of the instant application merely broadens the scope of the claim 1 of the Ling Patent'438 by eliminating the italicized and underlined portion of limitations 1, 2, 4 and 5 of Ling Patent'438's claim 1.

| Instant application | Ling Patent'438 |
|--|--|
| Claim 10: The method of claim 1, wherein said one or more physical layer communication parameter includes one or more of: transmit power, receive sensitivity, timeslot duration, modulation type, modulation | Claim 2: The method of claim 1, wherein said physical layer communication parameters include one or more of: transmit power, receive sensitivity, timeslot duration, modulation type, modulation order, |

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|---|---|
| order, forward error correction (FEC) type, and FEC code rate. | forward error correction (FEC) type, and FEC code rate. |
| Claim 11: The method of claim 1, wherein said CMTS uses orthogonal frequency division multiplexing (OFDM) over a plurality of subcarriers for said communicating. | Claim 3: The method of claim 1, wherein said CMTS uses orthogonal frequency division multiplexing (OFDM) over a plurality of subcarriers for said communicating. |
| Claim 12: The method of claim 3, comprising selecting, by said CMTS, said one or more physical layer communication parameter on a per-OFDM-subcarrier basis. | Claim 4: The method of claim 3, comprising selecting, by said CMTS, said physical layer communication parameters on a per-OFDM-subcarrier basis. |
| Claim 13: The method of claim 4, wherein said one or more physical layer communication parameter includes one or both of: which of said OFDM subcarriers to use for transmission to said CMTS, and which of said OFDM subcarriers to use for reception of information from said CMTS. | Claim 5: The method of claim 4, wherein said physical layer communication parameters include one or both of: which of said OFDM subcarriers to use for transmission to said CMTS, and which of said OFDM subcarriers to use for reception of information from said CMTS. |
| Claim 14: The method of claim 1, wherein: said plurality of service groups comprises a first service group and a second service group; said first service group has a first composite SNR versus frequency profile, said second service group has a second composite SNR versus frequency profile, and a particular cable modem has a particular SNR versus frequency profile; and said assigning said each cable modem among said plurality of service groups comprises, for the particular cable modem: assigning said particular cable modem to said first service group if said particular SNR versus frequency profile is more similar to said first composite SNR versus frequency profile than to said second composite SNR versus frequency profile; and assigning said particular cable modem to said second service group if said particular SNR versus frequency profile is more similar to said second | Claim 6: The method of claim 1, wherein: said plurality of service groups comprises a first service group and a second service group; said first service group has a first composite SNR versus frequency profile, said second service group has a second composite SNR versus frequency profile, and a third cable modem has a particular SNR versus frequency profile; and said assigning said plurality of cable modems among said plurality of service groups comprises: assigning said third cable modem to said first service group if said particular SNR versus frequency profile is more similar to said first composite SNR versus frequency profile than to said second composite SNR versus frequency profile; and assigning said third cable modem to said second service group if said particular SNR versus frequency profile is more similar to said second composite SNR versus |

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|---|---|
| composite SNR versus frequency profile than to said first composite SNR versus frequency profile. | frequency profile than to said first composite SNR versus frequency profile. |
| Claim 15: The method of claim 1, comprising assigning said cable modems among said plurality of service groups based on respective distances between said CMTS and said cable modems. | Claim 7: The method of claim 1, comprising assigning said plurality of cable modems among said plurality of service groups based on distances between said CMTS and said plurality of cable modems. |
| Claim 16: The method of claim 1, comprising assigning any particular one of said cable modems to one of said plurality of service groups based on which one or more of a plurality of branch amplifiers are upstream of said one of said plurality of cable modems. | Claim 8: The method of claim 1, comprising assigning any particular one of said plurality of cable modems to one of said plurality of service groups based on which one or more of a plurality of branch amplifiers are upstream of said one of said plurality of cable modems. |
| Claim 17: The method of claim 1, wherein said determining said plurality of SNR-related metrics comprises: transmitting a probe message to each cable modem, said probe message comprising instructions for measuring a metric and reporting said measured metric back to said CMTS; and receiving a metric reporting message from each cable modem. | Claim 9: The method of claim 1, wherein said determining said plurality of SNR-related metrics comprises: transmitting a probe message to each said plurality of cable modems, said probe message comprising instructions for measuring a metric and reporting said measured metric back to said CMTS; and receiving a metric reporting message from each of said plurality of cable modems. |

In view of the above, the conflicting claims are not patentably distinct from each other because claims 2-9 of the instant application are merely similar to the scope of the claims 2-9 of the Ling Patent'438.

| Claim 10 of Instant application | Claim 10 of Ling Patent'438 |
|---|---|
| Limitation 1 : A system comprising: circuitry for use in a cable modem termination system (CMTS), said circuitry comprising a network interface and a processor wherein: | Limitation 1 : A system comprising: circuitry for use in a cable modem termination system (CMTS), said circuitry comprising a network interface and a processor wherein: |
| Limitation 2 : said processor is configured to determine, for each cable modem served by said CMTS, a | Limitation 2 : said processor is configured to determine, <u>for a plurality of cable modems</u> served by said |

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| Claim 10 of Instant application | Claim 10 of Ling Patent'438 |
|--|---|
| corresponding signal-to-noise ratio (SNR) related metric; | CMTS, a corresponding plurality of signal-to-noise ratio (SNR) related metrics; |
| Limitation 3 : said processor is configured to assign each of said cable modems among a plurality of service groups based on a respective corresponding SNR-related metric; | Limitation 3 : said processor is configured to assign <u>said plurality of cable modems</u> among a plurality of service groups based on said plurality of SNR-related metrics; |
| Limitation 4 : said processor is configured to generate, for each one of said plurality of service groups, a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics corresponding to said one of said plurality of service groups; | Limitation 4 : said processor is configured to generate, for each one of said plurality of service groups, a composite SNR-related metric based at least in part on a worst-case SNR of said plurality of SNR-related metrics corresponding to said one of said plurality of service groups; |
| Limitation 5 : said processor is configured to select one or more physical layer communication parameter to be used for communicating with said one of said plurality of service groups based on said composite SNR-related metric; and | Limitation 5 : said processor is configured <u>to select physical layer communication parameters</u> to be used for communicating with said one of said plurality of service groups based on said composite SNR-related metric; and |
| Limitation 6 : said network interface is configured to communicate with one or more cable modems corresponding to said one of said plurality of service groups using the one or more selected physical layer communication parameter. | Limitation 6 : said network interface is configured to communicate with a portion of said plurality of cable modems corresponding to said one of said plurality of service groups using the <u>selected physical layer communication parameters</u> . |

In view of the above, it is clear that the conflicting claims are not patentably distinct from each other because claim 10 of the instant application merely broadens the scope of the claim 10 of the Ling Patent by eliminating the italicized and underlined portion of limitations 2, 3, 5 and 6 of Ling Patent'438's claim 10.

| Instant application | Ling Patent'438 |
|--|---|
| Claim 11: The system of claim 10, wherein said one or more physical layer communication parameter | Claim 11: The system of claim 10, wherein said physical layer communication parameters include one |

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|---|---|
| includes one or more of: transmit power, receive sensitivity, timeslot duration, modulation type, modulation order, forward error correction (FEC) type, and FEC code rate. | or more of: transmit power, receive sensitivity, timeslot duration, modulation type, modulation order, forward error correction (FEC) type, and FEC code rate. |
| Claim 12: The system of claim 10, wherein said network interface and said cable modems are configured to communicate using orthogonal frequency division multiplexing (OFDM) over a plurality of subcarriers. | Claim 12: The system of claim 10, wherein said network interface and said plurality of cable modems are configured to communicate using orthogonal frequency division multiplexing (OFDM) over a plurality of subcarriers. |
| Claim 13: The system of claim 12, wherein said network interface is configured such that at least one of said one or more physical layer communication parameters are configurable on a per-OFDM-subcarrier basis. | Claim 13: The system of claim 12, wherein said network interface is configured such that said physical layer communication parameters are configurable on a per-OFDM-subcarrier basis. |
| Claim 14: The system of claim 12, wherein said one or more physical layer communication parameter includes one or both of: which of said OFDM subcarriers to use for transmission to said CMTS, and which of said OFDM subcarriers to use for reception of information from said CMTS. | Claim 14: The system of claim 12, wherein said physical layer communication parameters include one or both of: which of said OFDM subcarriers to use for transmission to said CMTS, and which of said OFDM subcarriers to use for reception of information from said CMTS. |
| Claim 15: The system of claim 10, wherein: said plurality of service groups comprises a first service group and a second service group; said first service group has a first composite SNR versus frequency profile, said second service group has a second composite SNR versus frequency profile, and a particular cable modem has a particular SNR versus frequency profile; said assignment of said each cable modem among said plurality of service groups comprises, for the particular cable modem: assignment of said particular cable modem to said first service group if said particular SNR versus frequency profile is more similar to said first | Claim 15: The system of claim 10, wherein: said plurality of service groups comprises a first service group and a second service group; said first service group has a first composite SNR versus frequency profile, said second service group has a second composite SNR versus frequency profile, and a third cable modem has a particular SNR versus frequency profile; said assignment of said plurality of cable modems among said plurality of service groups comprises: assignment of said third cable modem to said first service group if said particular SNR versus frequency profile is more similar to said first composite SNR versus |

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|--|---|
| composite SNR versus frequency profile than to said second composite SNR versus frequency profile; and assignment of said particular cable modem to said second service group if said particular SNR versus frequency profile is more similar to said second composite SNR versus frequency profile than to said first composite SNR versus frequency profile. | frequency profile than to said second composite SNR versus frequency profile; and assignment of said third cable modem to said second service group if said particular SNR versus frequency profile is more similar to said second composite SNR versus frequency profile than to said first composite SNR versus frequency profile. |
| Claim 16: The system of claim 10, wherein said processor is configured to assign said cable modems among said plurality of service groups based on respective distances between said CMTS and said cable modems. | Claim 16: The system of claim 10, wherein said processor is configured to assign said plurality of cable modems among said plurality of service groups based on distances between said CMTS and said plurality of cable modems. |
| Claim 17: The system of claim 10, wherein said processor is configured to assign each of said cable modems among said plurality of service groups based on one or more branch amplifier that serves said each of said cable modems. | Claim 17: The system of claim 10, wherein said processor is configured to assign said plurality of cable modems among said plurality of service groups based on a branch further branch amplifier that serves each of said plurality of cable modems. |
| Claim 18: The system of claim 10, wherein said determination of said plurality of SNR-related metrics comprises: transmission, via said network interface, of a probe message to each cable modem, said probe message comprising instructions for measuring a metric and reporting said measured metric back to said CMTS; and reception, via said network interface of said CMTS, of a metric reporting message from each cable modem. | Claim 18: The system of claim 10, wherein said determination of said plurality of SNR-related metrics comprises: transmission, via said network interface, of a probe message to each said plurality of cable modems, said probe message comprising instructions for measuring a metric and reporting said measured metric back to said CMTS; and reception, via said network interface of said CMTS, of a metric reporting message from each of said plurality of cable modems. |

In view of the above, the conflicting claims are not patentably distinct from each other because claims 11-18 of the instant application are merely similar to the scope of the claims 11-18 of the Ling Patent'438.

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It has been held that the omission an element and its function is an obvious expedient if the remaining elements perform the same function as before. *In re Karlson*, 136 USPQ 184 (CCPA). Also note *Ex parte Rainu*, 168 USPQ 375 (Bd.App.1969); omission of a reference element whose function is not needed would be obvious to one skilled in the art. Moreover, the doctrine of double patenting seeks to prevent the unjustified extension of patent exclusivity beyond the term of a patent.

Allowable Subject Matter

7. **Claims 1-18 would be allowable** if overcome the rejections **on the ground of nonstatutory double patenting** set forth in this Office action.

8. The following is an examiner's statement of reasons for allowance:

Claims 1-18 are allowed over the prior arts, since the prior arts taken individually or in combination fail to particular disclose, fairly suggest, or render obvious the following under limitation:

In claims 1 and 10, "*...a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics corresponding to said one of said plurality of service groups...*" in combination with other limitations recited in the claims.

Noted that the **first closes prior art US Patent 8,743,933 B2** to Prodan et al. (*hereafter refers as Prodan*), teaches a method (*a method for allocating frequency spectrum and modulation scheme for each of the cable modems, see abstract*) comprising:

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determining, by a cable modem termination system (CMTS) *(the method is performed by a cable modem termination system, CMTS, col. 7, lines 10-15 and col. 8, lines 4-9)*, for a plurality of cable modems served by said CMTS *(determining for each of the cable modems, CMs, connected to the CMTS, col. 4, lines 56-62)*, a corresponding plurality of signal-to-noise ratio (SNR) related metrics *(SNR vs. frequency profile for each of the CMs, col. 3, lines 50-55, col. 4, lines 56-62, col. 7, lines 10-22)*;

assigning, by said CMTs, said plurality of cable modems among a plurality of service groups based on said plurality of SNR-related metrics *(assigning each of plurality of CMs into one of the categories based on the plurality of SNR vs. frequency profiles and a **SNR profile** of each of the categories, col. 5, lines 5-20, col. 7, lines 10-20 and Fig. 2, 5)*;

generating, by said CMTS for each one of said plurality of service groups, a composite SNR related metric corresponding to said one of said plurality of service groups *(the CMTS retrieves SNR profile for each of the categories, col. 5, lines 10-20, and Fig. 5)*;

selecting, by said CMTS, physical layer communication parameters to be used for communicating with said one of said plurality of service groups based on said composite SNR-related metric *(assigning each of the plurality of cable modems, a respective modulation scheme and frequency spectrum to be used, based on SNR vs. frequency profile of the assigned group, Fig. 4, col. 5, lines 5-20 and col. 7, lines 23-54)*; and

communicating, by said CMTS, with a portion of said plurality of cable modems corresponding to said one of said plurality of service groups using said selected

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physical layer communication parameters *(the CMTS/headend assigns a respective frequency allocation based on category of each of the CMs to each of the CMs, col. 5, lines 50-67, col. 7, lines 23-45, thereby enable the CMTS/headend to communicate with each of the CMs based on the frequency allocation to each of the CMs, col. 7, lines 23-45).*

Thus, Prodan teaches a conventional technique of selecting physical layer communication parameters to each of the plural of cable modems based on SNR profile(s). However, Prodan does not teach a composite SNR-related metric based “at least in part on a worst-case SNR profile of said SNR-related metrics corresponding to said one of said plurality of service groups”. Therefore, Prodan does not teach the underlined limitation above when such limitation is incorporated with other limitations of the independent claims.

Noted that the **second closest prior art US 2009/0219856 A1 to Richardson et al.** *(hereafter refers as Richardson)* teaches a method comprising:

determining, by a modem termination system *(AP, Fig. 2, access point 200)*, for a plurality of terminals served by the modem, a corresponding plurality of signal-to-noise ratio (SNR) related metrics *(the AP determines for each of the terminal served by the AP, Fig. 5A, a corresponding SNR value, paragraph [0043])*;

assigning, by said modem termination system, said plurality of terminals among a plurality of service groups based on said plurality of SNR-related metrics *(the AP assigns each of the terminals to a corresponding group based on the average SNR value of each group, paragraphs [0070, 0074] and claim 24)*; and

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generating, by said modem termination system, a composite SNR related metric **based on a portion of said plurality of SNR related metrics corresponding to a particular group** *(the AP retrieves an average SNR value for each group, paragraphs [0070, 0074] and claim 24, thus the average SNR value of a group is based on a plurality of SNR values for each of the terminals in the group).*

However, Richardson does not teach that the composite SNR related metric based “**at least in part on a worst-case SNR profile of said SNR-related metrics corresponding to said one of said plurality of service groups**”. Therefore, Richardson does not teach the underlined limitation above when such limitation is incorporated with other limitations of the independent claims.

In view of the foregoing, **Prodan and Richardson**, when taken individually or in combination fail to particular disclose, fairly suggest, or render obvious the underlined limitations when such limitation is incorporated with other limitations of the base claims. Hence, **Claims 1-18 are allowable over the prior arts.**

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DUNG B. HUYNH whose telephone number is (571)270-7642. The examiner can normally be reached on M-F 9:00 AM - 6:00 PM.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an

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interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ian N. Moore can be reached on 571-272-3085. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/DUNG B HUYNH/
Primary Examiner, Art Unit 2469
March 29, 2018